

**REPORT OF THE
WORKING GROUP
ON
COMMAND AREA
DEVELOPMENT
FOR FORMULATION OF
THE PLAN PROPOSALS
FOR THE SIXTH
FIVE YEAR PLAN
1980-85**

INTRODUCTION

Vide Office Memoranda No.21 (4)/80-I&CAD dated the 1st, 14th & 23rd May and the 6th June, 1980 the Planning Commission set up a Working Group on the Command Area Development Programme with the following composition:

1.	Secretary, Deptt. of Agri. & Cooperation	Chairman
2.	Addl. Secy. (C), Department of Agri. & Coop.	Member
3.	Chairman, Central Ground Water Board, Deptt. of Agri & Coop.	Member
4.	Chief Engineer (WM), Deptt. of Agri. & Coop.	Member
5.	Joint Commissioner (WM), Deptt. of Agri. & Coop.	Member
6.	A representative of Planning Commission.	Member
7.	Shri S.C. Jain, Director, Deptt. of Economic Affairs, Ministry of Finance.	Member
8.	Addl. Agricultural Commissioner, Department of Agricultural & Cooperation.	Member
9.	Deputy Director-General, ICAR.	Member
10.	Director, Central Soil Salinity Research Institute, Karnal.	Member
11.	A representative of the Central Water Commission.	Member
12.	A representative of the Agricultural Refinance & Development Corporation.	Member
13.	Dr. S. Maudgal, Principal Scientific Officer, Deptt. of Science & Technology.	Member
14.	Deputy Secretary (CAD), Deptt. of Agri. and Coop.	Convenor

1.2 The terms of reference of the Working Group are as follows:-

- i) To carry out a quick review of the performance in terms of physical and financial targets under the Fifth Plan and the Annual Plan 1978-79 and 1979-80

taking into consideration various constraints, State-wise review may be attempted. Performance of the Central Sector Schemes may also be reviewed.

- ii) To recommend the strategy, policies and the programmes for development of command area programme during the Sixth Five Year Plan 1980-85 with particular reference to the requirements in respect of organisational and administrative set up etc.
- iii) To suggest measures for developing a cadre of professional managers of Command area administration and on-farm management of water.
- iv) To formulate yearwise programmes and estimates of outlays required in the public sector, institutional sector and likely investments from private sources.
- v) The following specific aspects may specially be dealt with while formulating the proposals:
 - a) Steps necessary to accelerate utilisation of irrigation potential in the Command Area Development projects where large potential still remains to be utilized.
 - b) Estimates of the increase in agricultural production due to the CAD Programme may be made for the period 1980-85.
 - c) Steps for ensuring equitable distribution of water through Warabandi and other appropriate systems.
 - d) Steps for preventing conveyance losses, water logging and salinisation and for improving on-farm management of water.
 - e) Suggestions with regard to streamlining the procedure for institutional lending in respect of the programme.
 - f) Proposals to reorient lending programme in favour of weaker sections such as small and marginal farmers backward classes including Scheduled Castes, etc.
 - g) Estimate of increase in employment potential due to the Command Area Development programme as well as

the increase in employment potential due to intensive agricultural activities.

h) To conduct a malady remedy analysis in a few selected command area projects so as to enhance the return from investment.

vi) To prepare Science and Technology Plan in the sector so that Science and Technology Programme could be clearly evolved in the sector.

1.3 The Working Group was allowed to co-opt respective State representatives while dealing with their programmes and was required to submit its final report to the Planning Commission by the 30th June, 1980.

1.4 The Working Group met on the 5th July, 1980 under the Chairmanship of Shri R.C. Sood, Additional Secretary (Crops) of the Department of Agriculture and Cooperation. The following representatives of the State Govts. were co-opted by the Working Group:

1. Shri Syed Hashim Ali, Secretary CAD Department, Government of Andhra Pradesh.
2. Dr. J.C. Kundra, Commissioner and Secretary (Special Agriculture Programmes), Government of Bihar.
3. Shri S.B. Lal, Agriculture Production Commissioner, Government of Madhya Pradesh.
4. Shri E.C. Saldanha, Secretary (Irrigation) and CAD Commissioner, Government of Maharashtra.
5. Shri H.K. Khan, Secretary Agriculture Cooperation and Forests, Government of Gujarat.
6. Shri J.S. Mehta, Principal Secretary, Government of Rajasthan.
7. Shri S.K. Bhatnagar, Agriculture Production Commissioner, Government of Uttar Pradesh.
8. Shri T.C. Dutt, Secretary (Agriculture), Government of West Bengal.

1.5 The following were present at the meeting of the Working Group:

1. Shri K.M. Maheshwari, Joint Adviser, (I&CAD) Planning Commission.
2. Shri S.C. Jain, Director, Department of Economic Affairs, New Delhi.
3. Shri G.N. Kathpalia, Joint Commissioner (WM) Department of Agriculture & Cooperation.
4. Shri J.S.P. Yadav, Director, Central Soil Salinity Research Institute, Karnal.
5. Shri H.R. Karnik, Director, Agricultural Refinance and Development Corporation, Bombay.
6. Dr.S. Maudgal, Principal Scientific Officer, Department of Science and Technology, New Delhi.
7. Shri Syed Hashim Ali, Secretary CAD Department, Government of Andhra Pradesh.
8. Shri J.S. Mehta, Principal Secretary, Government of Rajasthan.
9. Shri E.C. Saldanha, CAD Commissioner and Secretary Irrigation, Government of Maharashtra.
10. Shri S.K. Bhatnagar, Agricultural Production Commissioner, Government of Uttar Pradesh.
11. Shri B.K. Saha, Deputy Secretary, (CAD), Department of Agriculture and Cooperation.

1.6 The Working Group considered the Draft Report prepared by the Department of Agriculture and Cooperation and discussed it in detail. Members made a number of valuable suggestions which have been incorporated in this Report.

1.7 The Working Group expressed deep sorrow at the sudden demise of the late Shri J.K. Jain, Chairman, Central Ground Water Board, who had contributed considerably to the Command Area Development Programme and also the Minor Irrigation Programme in the country. His absence during the deliberations of the Working Group was deeply felt by all.

1.8 The Working Group acknowledges the efforts put in by the Staff of the Water Management Division and the CAD Section in preparing the Draft Report and also the Final Report.

(B.K. SAHA)
Convenor

CHAPTER-2

CONCEPT OF COMMAND AREA DEVELOPMENT

2.1 The development of irrigation has been progressing rapidly under the aegis of planned development since the beginning of the First Five Year Plan. Currently, the annual increase in irrigation potential is much more than the total irrigated area in many countries of the World. Considerable investment is being made in these projects and hence it is imperative that the nation gets its due return from the investment. Above all, irrigation not only increases agricultural production but also stabilizes the levels of production. This is all the more important since nature is not always very kind and we have to avoid dependence on other nations for our basic requirement: FOOD.

2.2 In the early stages of irrigation development in the country it was considered sufficient to deliver water to blocks of 100 to 150 ha. through pipe outlets taking off from the canals and distributaries. How the farmers within these blocks of 100-150 ha. shared the water or whether every person got an equitable share or not was left to be taken care of by the farmers themselves. It was soon realised that this situation was not very helpful since farmers at the tail-end of the block of 100-150 ha. rarely got water or got it too late and is too in--adequate a quantity to meet their requirements or even to just save the crops. Besides, the land within the block was uneven in many cases and the water could not be applied uniformly nor controlled as desired due to the undulations of the land. The development of agriculture was considered automatic once water was delivered at the outlet. In comparatively recent irrigation projects, the block was reduced from 100-150 ha. to about 40 ha. with an outlet discharge of about one cusec. Agricultural production increased only marginally since traditional varieties continued to be grown and modern irrigated agriculture was still not visible over the horizon. To meet this gap between the water and the land and between modern agricultural technology and the farmers, it was necessary that some organisation took upon itself the task of bridging the gap and organising coordinated development to meet the farmers' more exacting needs necessary for efficient and economic irrigated agriculture.

2.3 The total gross area under irrigation at the beginning of the era of planned development (1950-51) was 22.6 million ha. (9.7 million ha. from major/medium projects and 12.9 million ha. from minor schemes). Since then, some 146 major and 756 medium irrigation projects have been taken up for construction. The progressive investment during the Five Year Plans and Annual Plans has been about Rs. 7526 crores upto 1979-80 on major/medium projects and the potential created is 26.75 million ha. The potential through minor irrigation schemes is of the order of 30 million ha. bringing the total irrigation potential in the country to 56.75 million ha. upto 1979-80. However, the utilisation gap in major/medium projects is estimated to be about 3.85 million ha. which is more than 14% of the potential created. Given the current cost of creation of irrigation potential at about Rs. 10,000 per ha., this means that an investment of about Rs. 3850 crores is lying unutilised.

2.4 What is even more disquieting is the fact that the return in terms of increased production has been far below expectations. Irrigated areas did not come up to expectations in terms of assuring a minimum supply of agricultural production particularly food-grains. Attention was, therefore, focussed on the returns from our investment in irrigation. The urgent need for taking up the development of the command areas was reflected in the reports of the Minister's Committee on Under Utilisation of Irrigation Potential and the National Commission on Agriculture.

2.5 Some of the important short--comings of irrigation commands in the country are as follows:

- i) The absence of a distribution system within the outlet command which would take water upto each individual holding.
- ii) Absence of a system of rostering of the water to ensure each farmer within the outlet his due and equitable share of water.
- iii) Lack of an agency to take up planning and designing of land shaping and levelling works on an outlet command basis in those areas where the land is uneven.

- iv) Inadequate drainage network to drain off surplus water or remove water logging in low lying areas.
- v) Absence of an effective agricultural extension system which would advise the farmers on modern irrigated agriculture including the variety of crops to be grown, the type, quantum, mode and timing of application of inputs, etc.
- vi) Absence of a proper system of regulation and management of the irrigation net work to ensure deliveries of water in the right quantity and at the right time.
- vii) Absence of Infrastructure like a net work of roads, regulated markets, credit (both long and short-term), processing industries, etc.,
- viii) lack of coordination between the various departments involved in the development of the rural areas, particularly between irrigation and agriculture, to ensure an orchestrated development of the areas.

2.6 Integrated area development of the irrigation command envisages removal of the above short-comings through setting up an apex body, generally referred to as the command area development authority, at the project level which would consist of representatives of all disciplines and departments required for efficient utilisation of the land and water resources of the area. In particular, emphasis should be to first deliver the water to each farmer and, as such, efforts would concentrate on the construction of field channels within the outlet command from the outlet up to each individual holding, introduction of warabandi or a system of rotational scheduling of water supplies, improvement in the regulation and operation of the irrigation system, taking up land levelling and shaping works on behalf of the farmers by channelising institutional finance, coordinating with the agriculture department for an effective extension system, etc.

2.7 It was in this background that the Centrally Sponsored Scheme for Command Area Development was introduced during the Fifth Five Year Plan. Initially the programme covered 60 irrigation projects in 16 States (Appendix I). The programme was extended to 16 more projects (Appendix I) during 1979-80 with the approval of the Committee set up for the purpose.

2.8 The State Governments were encouraged to set up Command Area Development Authorities (CADA) and initiate some basic physical works like detailed soil surveys, topographical surveys, planning designing and supervision of OFD works, extension and improvement of the water delivery system within the outlet command, etc. in the selected commands by offering to share 50% of the cost of certain items. A fairly large organisation was envisaged with adequate powers over all the development departments including the Revenue Department Operating within the Command area so that the future development could be well coordinated and orchestrated. The CADAs were expected to take a comprehensive view of the farmers' needs ranging from OFD works, assured and timely supply of irrigation water, supply of inputs and credit, technical advice, etc. to a net work of roads, regulated markets and processing industries relevant to the agricultural produce of the area.

2.9 Central assistance on a matching basis was made available for the expenditure incurred on the establishment of the CAD Authorities and also a State level CAD Cell or Department, topographical/soil surveys, designing and supervision of OFD works, subsidy to small and marginal farmers for OFD works/ground water development, purchase of equipment for land development and equity capital contribution to the Land Development/Ground Water Development Corporations set up by the State Government. Some difficulties were faced in channelising institutional finance particularly for those farmers who were considered ineligible for institutional credit under the existing system. This gave birth to a Special Loan Account with the ARDC to which the Central Government contributed 50% of the requirements of each State and the balance was shared equally between the State Governments and the ARDC. The problems in obtaining institutional finance also led us to make available Central assistance in the form of loans to the State Governments for the construction of field channels.

2.10 It was envisaged that other items like the modernisation of the irrigation system, drainage, agricultural extension, infrastructure facilities like roads, regulated markets, processing industries, etc. would be taken care of by the State Governments within their normal Plan Programmes and the CADA would act as a catalyst for setting them up.

2.11 The response varied widely from State to State. A detailed review of the performance of the programme during the Fifth Five Year Plan (1974-78) and the years 1978-79 and 1979-80 is given in Chapter Three.



CHAPTER 3

REVIEW OF THE PROGRAMME DURING 1974-78, 1978-79 AND 1979-80

3.1 During the Fifth Five Year Plan, 38 CAD Authorities covering 50 irrigation projects had been set up in 13 States. The number of projects included under the programme was 60. During 1979-80, 16 more irrigation projects were included under the programme (Appendix I). One of these, the Salauli Irrigation Project, is located in the Union Territory of Goa which enters the programme for the first time. By March, 1980 43 CAD Authorities had been set up covering 70 irrigation projects. Of the 16 States and one Union Territory (Goa), only the projects falling in the following States have not been covered by CAD Authorities.

<u>States</u>	<u>No. of Projects</u>
1. Assam	1
2. Manipur	1
3. Tamil Nadu	3
4. Goa	1
Total	6



While Assam, Manipur and Goa have one project each, Tamil Nadu has three projects included under the programme.

Details regarding the physical achievements in the 70 projects is given in Appendix II. The total investment during the Fifth Plan period (1974-78) in the Central Sector was Rs.66.5 crores and in the State Sector it was Rs.56 crores. Another Rs.8.2 crores came from institutional sources (Appendix III). The State-wise break-up of Central assistance released during the Fifth Plan, is given in Appendix IV A.

3.2 The Fifth Plan was terminated in March, 78, and the new Five Year Plan 1978-83 commenced from the year 1978-79.

The pattern of financing the CAD Programme during 1978-79 was the same as during the Fifth Plan as it had not been possible to formulate the plan and obtain approval for a new pattern of financing. The amount released to the States during 1978-79 was Rs.29.11 crores. The detailed break up is given in Appendix V. The physical achievements during these years are given in Appendix II.

3.3 The pattern of financing the CAD programme underwent a change in 1979-80 to the extent that all items in which the Government of India's share was more than 50%, its liability was brought down to 50% and correspondingly the States' share was increased to 50%. In other words, all the items were now to be shared equally between the Centre and the States. The important items which underwent change are (i) contribution for subsidy to small and marginal farmers and (ii) the cost of construction of field channels. The latter was a 100% loan and was converted by the Expenditure Finance Committee to a 25% loan and 25% as a grant to the State Government. Due to the delay in finalising the new pattern of financing and the corresponding delay in releasing funds it was not possible to make the necessary efforts to step up the pace of the programme during that year. The Central assistance released was only Rs.24.85 crores (Appendix VI). Physical achievements during the year are given in Appendix-II. During the year 1979-80 the country witnessed a severe drought and Command Area Authorities were urged to take all possible measures to save water through the construction of field channels and warabandi, and to increase the cropped area as much as possible. Considerable areas were covered with field channels under the assistance available from the Food for Work Programme and the Special Food for Work Programme of the Ministry of Rural Reconstruction. Details of the achievements under the latter are not yet available.

3.4 It would be worth-while to make a brief review of the performance in the individual States.

3.5 Andhra Pradesh

3.5.1 This is the only State which has a completely separate department for CAD headed by a Secretary. There are four CAD Authorities comprising of the following irrigation projects: (1)Nagarjunasagar Left Bank Canal, (2) Nagarjunasagar

Right Bank Canal, (3) Sreeramasagar and (4) Tungabhadra, K.C. Canal, Gajuladinne and Rajoli-Bunda. These are headed by middle level administrators, Joint Registrars of Cooperative Societies, etc. with the necessary organisation at their command Execution of OFD works Agricultural Extension and Cooperative activities are the direct responsibility of the CADAS while they coordinate with the Irrigation Department the work of operation and management of the irrigation system and for roads with the PWD. Physical achievements under these projects are given in Appendix II.

3.5.2 The T&V System of Agricultural Extension has been introduced in the Nagarjunasagar, Sreeramasagar and Tungabhadra projects while warabandi has recently been introduced in the Sreeramasagar Project on a pilot scale. The cropping pattern is being reviewed by Technical Committees set up for the purpose.

3.5.3 The World Bank has extended a credit assistance of US \$ 145 million to cover the irrigation sector of Nagarjunasagar and the Command Area Development of the same and Sreeramasagar and Tungabhadra projects also. The CAD component consists mainly of ayacut roads, field channels, land levelling and shaping and extension.

3.5.4 One of the difficulties in the way of speedy development is the absence of any legislation to take up works compulsorily. A CAD Bill has been under consideration for the past two to three years but has not yet been enacted. The Ministry of Home Affairs have recently conveyed the assent of the President of India subject to some modifications being made. Field Units should be increased to take up the works on a scale required by the projects.

3.6 Assam

3.6.1 The Jamuna Irrigation Project has been included under the CAD Programme since the Fifth Plan but not much work has been done so far. No project organisation or CAD authority has been set up which could coordinate the development work of the area and also identify the nature of work to be done. A Central Task Force visited the State recently (March, 1980) and it was found that the irrigation system needs considerable improvement particularly by way of construction of minors, and regular outlets have to be constructed on the

minors apart from re-designing them. In view of the economic condition of Assam, it is absolutely essential that the State Government sets up an agency which would be responsible for the integrated development of the project. Farmers are still not used to irrigated agriculture and it may be necessary to send teams of farmers to other projects for demonstration and training.

3.7 Bihar

3.7.1 There are four CAD Agencies in Bihar consisting of the following irrigation projects: (1) Sone, (2) Gandak, (3) Kosi and (4) Kiul, Badua and Chandan. These have a total ultimate irrigation potential of 2.3 million ha. of which 1.72 million ha. have been created up to 1978-79.

3.7.2 Utilisation is generally poor except in the Sone command and the commands of Kiul, Badua and Chandan. Construction of field channels has been very slow mainly because of highly fragmented and small holdings. Land records are not upto date and consolidation is a must. Unfortunately both these take considerable time to complete due to organisational and socio-economic factors. However, attempts are being made to step up the construction of field channels along field boundaries as the terrain is more or less level. In areas where consolidation is to be taken up shortly, the alignment of field channels should be indicated to the consolidation staff so that the new holdings are on either side of the field channels. Details of physical achievements are given in Appendix II.

3.7.3 The State has considerable scope for ground water development, both shallow tube-wells and deep tube-wells, and the Authorities are encouraging/initiating development of ground water. During the period 1975-80 the State Government installed 1531 State tube-wells in the four commands through its Water Development Corporation.

3.7.4 The T&V System of extension has been introduced in three districts, one each in the commands of Kosi, Gandak and Sone. The system should be extended to the entire commands including Kiul, Badua and Chandan. An Expert Committee is reviewing the cropping pattern and its report is awaited. Yields have shown an increasing trend in recent years but much more could be achieved through better extension and coordinated supply of inputs.

3.7.5 The main emphasis under the CAD Programme should be on the construction of field channels and warabandi. In the irrigation sector, drainage schemes should be implemented quickly as water logging is a serious problem in many parts of the Command Areas.

3.8 Gujarat

3.8.1 Three major irrigation projects, namely Mahi-Kadana, Shetrungi and Ukai-Kakrapar were selected during the Fourth Five Year Plan for implementation of the CAD Programme. These were covered by two CAD Authorities. Recently the State Government have brought in new irrigation projects for command area development and after regrouping of the projects under each CAD Authority, a third CAD authority has been set up for North Gujarat and Saurashtra. The administrative department for the CAD programme is the department of Agriculture, Cooperation and Forests. The CAD Authorities are headed by Area Development Commissioners who are directly responsible for OFD works and are coordinating authorities for agricultural extension, operation and regulation of the canals, etc. Soil Conservation units carry out OFD works while field channels are generally done by the irrigation staff. The T & V system of extension has been introduced in the projects. The cropping pattern has been reviewed by technical teams and their reports are under the State Government's consideration. One of the main problems is that of drainage in Ukai-Kakrapar and Mahi-Kadana.

3.8.2 Physical achievements under the programme are given in Appendix II.

3.8.3 The main thrust of the programme in the State should be on the construction of field channels and Warabandi, drainage and a more effective agricultural extension. Efforts should be made to reduce the cost of land levelling and shaping works.

3.9 Haryana

3.9.1 Four irrigation projects (Appendix I) have been taken up for Command Area Development in Haryana. Though each of these projects have a separate Chief Project Officer they come under the overall supervision and control of the Commissioner, Hissar Division, who is also designated as the

Administrator for the Haryana CADA. The day to day work is looked after by the Chief Project Officers at the project level who are also looking after the DPAP & SFDA programmes. The legal status of the project authorities is that of Registered Societies. The administrative department incharge of the programme is Irrigation (earlier it was the Agriculture Department).

3.9.2 Details regarding the physical achievements under the programme are given in Appendix II. It may be observed that utilisation vis-a-vis creation of potential has been rather poor in these projects ranging from 14.3% to 52.6% with a weighted average of 29.8%. Not much work has been done so far under the CAD programme. Some kuchcha water courses/field channels have been constructed by the farmers. Due to low intensities of irrigation and sandy soil of the area the main need under the programme is that for lining of water courses. The work has been taken up in the Jui Lift Irrigation Scheme as part of the World Bank assisted Haryana Irrigation Project. Land levelling is also required in the area but not much has been achieved so far. Achievements upto 1979-80 are given in Appendix II and targets for 1980-85 are given in Appendix VIII. The agency for carrying out the lining of field channels is the Haryana State Minor Irrigation and Tube Wells Corporation while land levelling and shaping is done through Soil Conservation Units.

3.9.3 Due to the high cost of water, sophisticated irrigation techniques like sprinklers are becoming popular in the area particularly in the commands of private tube wells. Some sprinklers have also been tried on one outlet Command in Jui Canal system by the irrigation department of the State. The State Government should try to keep key project personnel at least for three to four years so that after picking up the work they are able to achieve some results.

3.10 Jammu And Kashmir

3.10.1 Until recently only the command of the Tawi project was included under the Centrally Sponsored Scheme. During 1979-80 the command of the neighbouring project, namely the Ravi project, has been added to the Centrally sponsored CAD Programme. The two projects are under one Area Development Commissioner who heads the CADA. Details of the ultimate

potential, potential created and that utilised are given in Appendix VII. It will be observed that the utilisation is rather poor in the Tawi Command (45%) while potential is yet to be created in the Ravi project. At the State level, the Agricultural production Commissioner is responsible for the CAD Programme in the State.

3.10.2 The organisation at the project level is still in a fluid state and it would take some time for a clear picture of the responsibilities of the CADA and the organisation to carry it out is available. At present the Area Development Commissioner acts as a coordinating agency between the various Departments involved. During 1979-80 land levelling was carried out in 2,070 ha. and field channels were constructed in 800 ha.

3.10.3 The T&V system of Agricultural Extension has been introduced in Vijaypur block in the command area and it is proposed to extend it to the entire command area shortly. The main thrust of the programme should be in the construction of field channels and introduction of warabandi to speed up the pace of utilisation.

3.11 Karnataka

3.11.1 Five Irrigation projects, namely Malaprabha, Ghata-prabha, Tungabhadra, Cauvery Basin (Krishnarajasagar) and Upper Krishna have been included from this State under the CAD Programme. Details of the ultimate potential, potential created and utilised, targets etc., are given in Appendix VII & VIII. Physical achievements during 1974-80 are given in Appendix II. The Planning and Development Department is incharge of the programme at the state level while four CADAs have been set up at the project levels consisting of (1) Malaprabha and Ghata-prabha, (2) Tungabhadra, (3) Krishnarajasagar and (4) Upper Krishna. These are headed by officers of the rank of Divisional Commissioner or Chief Engineer. There is a CAD Act in the State which gives adequate powers to the authorities to carry out their responsibilities.

3.11.2 Karnataka is one of those States which have decided to construct field channels upto each individual holding at project cost. While the Upper Krishna Project has its own

field organisation to carry out OFD works, in the other projects in the State the work is being done by coordinating the efforts of the development departments involved. Field channels are constructed by the Irrigation Department (as part of the project) while land levelling/shaping is carried out by the Soil Conservation Agency through the Agro Industries Corporation, Tractor Cooperatives and also tractors owned by individuals by providing loans through Land Development Banks.

3.11.3 Physical achievements are given in Appendix II. The T&V System of Agricultural Extension has been introduced in the command areas. Substantial increases in crop yields have been achieved under the CAD Programme (Appendix X).

3.12 Kerala

3.12.1 Originally three irrigation projects, viz. Chalakudi, Peechi and Malampuzha, were included under the Centrally Sponsored CAD Programme. Seven more projects were added during 1979-80 primarily on the ground that the commands of these projects were territorially very near and sometimes protruded between the selected commands and disparities in the development efforts created problems. These new projects are Mangalam, Pothundi, Gayatri, Walayar, Cheerukuzhy, Vazhani and Neyyar (Appendix I).

3.12.2 The total ultimate potential of these projects is 1,67,760 ha. all of which has already been created. In view of the size of the State and the sizes of the individual projects only one CAD Authority has been set up in the entire state to cover all the projects. Some of the commands are below sea level and hence pose the problem of drainage after heavy showers. These lands are referred to as Kole Lands and a special type of land development/construction of field channels is involved to meet the needs of the project. There is a separate Kerala Land Development Corporation which does the work on behalf of the farmers with institutional finance. The bulk of the farmers being small/marginal, subsidy is available for the work. CAD is still in its infancy in the State but with the keen interest being taken by the State Government it is expected that work could be taken up and considerable progress made during the Sixth Plan period.

3.13 Madhya Pradesh

3.13.1 Seven Irrigation Projects, namely, the Chambal, Tawa, Barna, Halali, Hasdeo, Kharung and Maniyari have been included under the Centrally Sponsored Scheme during the Fifth Plan period. Chambal and Tawa projects have been active for quite some time with the setting up of CAD Authorities and have also been the recipients of external assistance. Two CAD authorities have been set up recently for Barna and Halali and for Hasdeo, Kharung and Maniyari projects. While the two older projects have a separate Ayacut Development Commissioner for each, the newly created CAD Authorities are headed by the Divisional Commissioner of the Revenue Division within which the commands fall. At the State level, the Agricultural Production Commissioner-cum-Secretary, Agriculture supervises the programme. We have been suggesting the setting up of a full fledged CAD Cell at the State level, but so far this has not materialised.

3.13.2 The main progress under the programme has been in the projects of Tawa and Chambal. In the Tawa Project the need for full package OFD is considerably more. In fact a substantial part of the command is to be covered by land levelling and shaping and the construction of field channels.

Drainage is also a problem in this project. In the Chambal Project, the main items of work that have been taken up are the construction of field channels and chak drainage works. The Tawa Project is being assisted by the Federal Republic of Germany while the Chambal project is being assisted by the IDA (World Bank). The externally assisted project periods have been extended in both cases. It is expected that the Chambal project would terminate in 1980-81 and utilise the entire credit of US \$ 24 million. The Tawa Project would be completed around 1983-84.

3.13.3 The field units in all the projects, more particularly the ones in which the CADAs have just been set up, should be strengthened so that work on field channels can continue with increased speed. Warabandi has not yet found its roots in the State. It is expected that it would be introduced in pilot areas shortly.

3.13.4 Project reports for Barna-Halali and Hasdeo-Kharung, Maniyari Projects are under preparation and it is expected that once these are finalised and accepted by the State Govt. work would pick up quickly.

3.13.5 An interesting feature of the two older projects in the State is that the district(s) in which the commands lie have been carved out of their existing Revenue Divisions and constituted into new divisions under a Divisional Commissioner who is also the head of the CADA. Thus Hoshangabad (Tawa) is a one District Division and Bhind-Morena (Chambal) are a two-district division. This ensures smooth administration and coordination and involvement of all the functionaries in the district as may be required and determined by the Commissioners without introducing new systems and norms of administration which take considerable time to establish.

3.14 Maharashtra

3.14.1 Fifteen irrigation projects have been included under the Centrally Sponsored CAD Programme from this State up to March, 80 (Appendix-I). These fifteen projects have been brought under the jurisdiction of six CAD Authorities which are grouped as follows:

1. Bagh, Itiadoh and Pench,
2. Bhima and Ghod,
3. Jayakwadi (Stage I and Stage II),
Purna and Upper Penganga.
4. Girna, Panzan, Left Bank Canal and Upper
Tapi State I.
5. Kukadi and Mula.
6. Krishna and Warna

Each of these CAD Authorities is headed by officers of the level of Superintending Engineer. There is a separate Land Development Corporation to carry out on-farm development works including the construction of field channels. Details of the CCA, potential created and utilised, area covered with physical works, etc. are given in Appendix II and VII.

3.14.2 The Administrator of the CADA is directly responsible for the operation and maintenance of the canal system and for OFD works. While the agricultural extension system is under his control, he coordinates the cooperation activities in the area. At the State level there is a full fledged Secretary-cum-Commissioner for CAD to look after the work though it comes under the overall umbrella of the Irrigation Department. There is a CAD Board for each authority which is presided over by the Minister for Irrigation and CAD of the Government of Maharashtra. Policy decisions are taken by a Cabinet Sub-Committee with the Chief Minister as its Chairman.

3.14.3 OFD works are executed by the Maharashtra Land Development Corporation through the Soil Conservation units of the Department of Agriculture. The Administrators of the CADAs exercise administrative and technical control over this staff. The T&V System of Agricultural Extension has been introduced in some of the CAD projects and is under the control of the Administrator. In some of the older projects specific field staff called Irrigation Units have been sanctioned to look after extension work and are under the direct control of the Administrators.

3.14.4 For rotational distribution of water among the farmers the system in operation is what is known as the "Shejpali system." This, in brief, is that the schedule of water distribution within the chak begins with the last field (tail-end) and the next field gets it after the first has taken water to the farmer's satisfaction. Since the areas in which the farmer can grow irrigated crops and the type of crops are determined by the applications made by him and sanctioned by the Irrigation Department he cannot take advantage of the system and draw enough water to irrigate his whole holding as the penalty for irrigating areas in excess of the sanctioned area is very high and deterrent. A system of warabandi known as the Rotational Water Supply system is being tried on a pilot scale in Girna and Jayawkwadi projects. The results have been encouraging and it is likely that the new system would be extended to larger areas and ultimately to the entire commands.

3.14.5 Technical Committees for reviewing the cropping patterns were appointed for nine irrigation projects which were included during the Fifth Plan and their reports/recom-

mendations are under consideration of the State Government. Girna, Purna, Ghod, Jayakwadi and Mula Projects have drainage problems. The State Government have plans to tackle this but the progress is slow.

3.14.6 World Bank assistance: The Command Area Development Programme in Purna and Jayakwadi irrigation projects is being financially assisted through the Maharashtra Irrigation I project by the IDA/World Bank under which the project will get a loan assistance of U.S \$ 70 million. Reimbursement of U.S. \$ 19.8 million have been claimed for this project upto the end of March 1980. The project became effective from January, 1978 and will end in March 1983. Bhima Krishna, Kukadi, Upper Penganga, Warna and Upper Wardha Projects have been included under the Maharashtra Composite Irrigation Project being assisted by the World Bank (IDA) and IFAD under which a loan of U.S. \$ 210 million by the World Bank and U.S. \$ 50 million would be made available by the IFAD. The project became effective in early 1980 and will end in September, 1984. This project also includes the modernisation of Mula and Girna irrigation projects. Lining of field channels upto 8 ha. blocks is envisaged under this agreement as a part of the irrigation infrastructure, in addition to field channels, field drains and roads in the command areas.

3.14.7 Maharashtra has extended the coverage under CAD to a large number of projects spread out over the entire State. Field Units are not adequate to achieve the desirable targets. Modernisation in some of the older projects (Ghod, Bagh and Itiadoh) should be taken up. The working of the Maharashtra Land Development Corporation should be improved to facilitate faster flow of institutional finance for OFD works.

3.15 Manipur

3.15.1 The Loktak Lift Irrigation Scheme is the only project in the State which has been included under the Centrally Sponsored Scheme during the Fifth Plan. The project has an ultimate irrigation potential of 40,000 ha. and a CCA of 24,000ha. The scheme was linked with the setting up of a hydro-electric power station in the State but due to unforeseen difficulties the latter has been delayed. Consequently the creation of irrigation potential has also been lagging behind schedule.

Only 1,000 ha. has been brought under irrigation during 1979 and during the current year it is proposed to be increased to 4,000ha. No CAD Authority or organisation at the project level has been set up though it has been under the consideration of the State Government for some time. Not much land levelling would be required since the command area is nearly flat and paddy is the most likely crop. However, field channels would have to be constructed and the extension machinery put on the ground for achieving results. Along with field channels warabandi should also be introduced.

3.16 Orissa

3.16.1 Three major irrigation projects have been included under the CAD Programme from Orissa. These are Hirakud, Mahanadi Delta and Salandi Projects. The ultimate potential of these three projects together is 837,830 ha. (Appendix VIII). CAD Authorities have been set up for all the three projects headed by the Divisional Commissioners of the Revenue Divisions within whose jurisdiction the Command Area fall. For the day to day working of the projects, project Directors have been appointed who are drawn from the State Civil Service.

3.16.2 Though the projects report 100% utilisation of the ultimate irrigation potential which has already been created there is considerable scope for saving of water through the construction of field channels. Since Paddy is the main crop in these commands heavy water logging takes place and in the areas with high slopes water seeps to the lower areas when irrigation water is applied to the higher areas. Controlled application of water would not only save water but also increase yields since only the correct quantities foster healthy growth of the plants.

3.16.3 There is a World Bank Credit Assistance for Orrisa Medium Irrigation Projects which includes land levelling and shaping in 57,000 ha. of these three commands and 200,000ha under consolidation of holdings. The work of consolidation of holdings is going on at a good pace and a substantial part has already been completed. Practically no progress has been made in land levelling and shaping works since the State Government is yet undecided as to how the works are to be financed and executed. The main difficulty is in deciding

whether to finance it through budgetary resources or through Institutional finance and recover it from the farmers.

3.16.4 Physical achievements under the CAD Programme and other information regarding the projects are given in Appendix II, VII & VIII.

3.17 Rajasthan

3.17.1 The Command of the Chambal Irrigation Project lying in Rajasthan, the Rajasthan Canal Project Stage I, the Bhakra and Gang Canal Systems have been included under the CAD Programme. The State has been doing very well under the programme, particularly in the Chambal and RCP Command Areas both of which are being assisted by the World Bank/IDA. Bhakra and Gang Canal Command Areas have reported full utilisation. The main work to be taken up under the programme is the lining of water courses (Field Channels) and the construction of roads in the ayacut. Recently phase II of RCP Stage I CAD has been included for assistance from the International Fund for Agricultural Development.

3.17.2 Details of the ultimate irrigation potential, potential created and utilised, CCA, physical achievements, etc. are given in Appendix II, VII and VIII. The main work in the Chambal Project is that of land levelling and shaping and the construction of field channels along with introduction of warabandi. Other works like better water management and ayacut roads have also been taken up in the project. The work of land levelling and shaping is done by the Soil Conservation staff with the CADA in close association with Rajasthan Land Development Corporation. In the RCP, the main work is that of lining of water courses, afforestation, drinking water supply, ayacut roads, etc. Lining of water courses up to each individual holding is being done by the Irrigation Department with CADA with financing through the Rajasthan Development Corporation (RLDC). The RLDC plays the role of a financing agency for channelising institutional finance.

3.17.3 The State has been facing considerable difficulties in obtaining coal for the RCP due to non availability of coal rakes. The matter has been under discussion and correspondence with the Railway Ministry for the last two years.

3.17.4 While warabandi is being implemented successfully in the RCP area and the Gang and Bhakra Canal system, in the Chambal Project this is yet to make head-way. Efforts have been initiated recently to implement warabandi in this project also.

3.18 Tamil Nadu

3.18.1 Three Irrigation projects, namely, the Cauvery Delta, Lower Bhawani and Periyar Vaigai, were selected for the Centrally Sponsored CAD Programme during the Fifth Plan. The State has not shown much interest in the programme and the type of physical works and organisation envisaged under it. As a result, not much physical works have been carried out. Recently the State Govt. representatives had discussed with the representatives of the Department of Agriculture and Co-operation and it was clarified that setting up a large organisation in the form of a CAD Authority was not a pre-condition to taking up the physical works and taking Central assistance for the purpose. It is likely that the programme would pick up during the Sixth Plan period (1980-85).

3.18.2 There is a Coordination Committee at the district level under the Chairmanship of the Collector for the Cauvery Delta Project and for the present the work of construction of field channels etc. would be implemented through this committee with the help of the Soil Conservation staff of the Department of Agriculture. Details of the projects are given in Appendix II, VII & VIII.

3.19 Uttar Pradesh

3.19.1 This State has some of the largest commands in the country which have been included in the CAD Programme. Sarda Sahayak is the largest single project in terms of ultimate potential which is about 1.8 million ha. The other projects are the Ramganga and the Gandak (U.P.). Essential details relating to the projects are given in Appendix II, VII & VIII.

3.19.2 CAD Authorities headed by officers of the rank of Divisional Commissioner have been set up in the projects while there is a separate Area Development Cell in the Department of Agriculture at the State Level. As the topography in

all the command areas is such that land levelling/shaping works are not required, the main thrust of the programme in the State is in the construction of field channels and introduction of Warabandi Construction of field channels have made remarkable progress during the last few years as may be seen from Appendix II. In fact Uttar Pradesh has taken the lead as far as construction of field channels is concerned. However, in view of the very large command areas involved and the need to cover the entire command areas with field channels within the next few years, there is an urgent need to increase the number of field units to carry out physical works. Warabandi is in force in some parts of Western Uttar Pradesh but in general there is need for introducing it in all the commands through concerted efforts, and a time bound programme. The projects in the State have drainage problems which have to be tackled with determination if water logging is to be avoided or removed. The State has not yet adopted the T&V System of Agricultural Extension. It should immediately go into the question and decide on an intensive and effective system of Agricultural Extension.

3.20 West Bengal

3.20.1 Three major irrigation projects (Appendix I) have been included in the CAD Programme from West Bengal. CAD Authorities have been set up in all the three projects under the Chairmanship of the Divisional Commissioner of Burdwan. The projects are headed by project Administrators who are of level of Superintending Engineer/Joint Director of Agriculture. The CADAs do not have any field units under their direct control to carry out the construction of field channels etc. and have to depend entirely on persuasive efforts. Coordination between the various disciplines involved is not very good except where understanding is reached entirely on a person to person basis. Physical details of the projects are given in Appendix II, VII & VIII. It will be noticed that not much work has really been done in these commands.

3.20.2 There is considerable scope for conjunctive use of ground water and the water table is very high. The CADAs have been promoting the exploitation of ground water in the blocks included in the CAD Programme but only in those areas where canal water does not reach. Suggestions have been made to extend ground water exploitation to the areas covered by

the canal commands also since this could make possible a 2nd or 3rd crop in a major part of the commands.

3.20.3 The T&V System of Agricultural Extension has been introduced in projects but the CADAs have no control over it. Warabandi has not yet been attempted in the State. The immediate requirement is to place field units directly under the CADAs for taking up the construction of field channels and also to vest power for control over other development departments. A complete reorganisation of the organisational set up and the functions of the CADAs is under the active consideration of the State Government.

3.21 Goa

3.21.1 The Salauli Irrigation Project has been included under the Central Sector CAD Programme during the year 1979-80. The project is still under construction and upto the end of March, 1979 no irrigation potential had been created. The ultimate irrigation potential of this project is 21,240ha, with an irrigation intensity of 148%. It has a Gross Command Area of 23,876 ha. and an irrigable command area/culturable Command area of 14366 ha. Full irrigation potential in this project is expected to be created by June, 1982.

3.21.2 So far, no Command Area Development Authority has been created and neither is there a project level organisation to take up the work. However, the Union Territory Government is willing to create a Command Area Development Authority for this project in the very near future in the Irrigation Department under the overall charge of the Agricultural Production Commissioner, which will be headed by a Superintendent Engineer with the necessary field staff on the same pattern as in Maharashtra.

CHAPTER-4

MALADY/REMEDY ANALYSIS

4.1 Command Area Development Programme essentially comprises orchestration of a package of practices covering a wide range of allied field activities. Accomplishment of this complicated task requires an intensive extension effort and an adequate and efficient organisational infrastructure for implementation of the parts of the Programme to be directly executed and achieving a high degree of coordination among the services/programmes handled or to be handled by other Departments, organisations or institutions. On the basis of experience gained during the last 4-5 years, a number of problems have been identified which have been impeding the progress of the CAD Programme. The nature and the intensity of these problems varies from State to State depending on the available administrative infra-structure, the type of legislation regarding land holdings and land tenure systems, the extent of willingness on the part of the State Government to take up the programme etc.

4.2 Some of the major problems identified are:-

- i) Absence of a command area development authority at the State or project level charged with the responsibility of carrying out integrated and comprehensive development of the selected command areas. Such a situation exists in the States of Assam, Manipur and Tamil Nadu where CAD Authorities have not been established so far.
- ii) In some of the States like Andhra Pradesh, Haryana, West Bengal, the CAD Authorities at the Project level are manned by junior officers who do not carry enough weight to bring all the development activities under the common umbrella of CAD.
- iii) Even where CAD Authorities have been set up and are manned by senior level officers, all the important development Departments have not been

brought under these Authorities as a result of which the integrated development of the Commands could not be taken up. In the States of Uttar Pradesh, Gujarat, Andhra Pradesh, Bihar and J&K the CAD Administrator has a direct control only over the organisations responsible for execution of on farm development works whereas they work as coordinating officers in regard to the staff of irrigation, agriculture and cooperation Departments. In case of Karnataka, West Bengal, Orissa, Kerala and Haryana, the CAD Administrators perform only the so-called coordinating duties for all the activities including on-farm development works which are also carried out by various departments such as Irrigation, Agriculture etc. The organisational pattern in the States of Rajasthan, Madhya Pradesh and Maharashtra were recommended for adoption.

- iv) In some of the States like Gujarat, where senior level officers are incharge of the CAD at the project level, they have no full time officer at the State level to coordinate and monitor the CAD programme in the State as a result of which proper monitoring of the programme and quick policy decisions are lacking resulting in poor progress.
- v) Inadequacy of field organisations in a number of projects to handle survey, planning, designing and execution of onfarm development works and other programmes have resulted in poor progress of OFD works especially in the States of West Bengal Orissa and Assam etc.
- vi) In some of the States, there is no enabling legislation to take up OFD works on compulsory basis in the outlet commands as also for implementation of Warabandi etc. and has resulted in slow physical progress.
- vii) As a result of inadequate attention being paid in most of the projects to other important items of the CAD projects such as proper regulation

and scheduling of irrigation supplies to meet the crop needs, introduction of Warabandi/turn schedule within the outlet commands, crop planning, agricultural extension, supply of agricultural inputs including short-term credit, provision of supplemental irrigation through ground water development etc., full impact of command area development programme on agricultural production could not be achieved.

- viii) Inadequate progress has been achieved on infrastructural items such as modernisation of irrigation system, construction of drainage, network provision of roads and regulated markets etc. except in the projects which have been taken up with the World Bank/IDA assistance. In fact, there is lack of proper rapport between the CAD Authorities, the Irrigation Deptt. and other agencies. Unless these items are taken care of simultaneously, OFD as contemplated, would not be sufficiently effective.
- ix) Frequent transfers of the CAD Administrators at the project level and field officers manning the field formations have resulted in lack of continuity in the implementation of the CAD programme and poor progress of physical works.
- x) There is lack of adequate facilities to the officers who are deputed to the CAD Authorities as a result of which qualified and efficient officers are reluctant to come to the CAD Authorities. Even some of the facilities which these officers deputed to CAD Authorities, were enjoying in their parent departments such as rent free free accommodation, project allowance etc. are denied under the CAD set up. This has been responsible for a large number of posts remaining vacant.
- xi) Inadequate availability of raw-materials like cement and coal for undertaking the lining of field channels, construction of irrigation and

drainage structures and construction of outlet gates etc. has resulted in slow progress under these items.

- xii) Inadequate focus being given to the CAD programme in some of the States due to lack of proper appreciation of the benefits of this programme among the State Govt. and the various development departments involved in this programme due to inter departmental rivalries.

Remedies

4.3 On the basis of experience gained so far following remedial measures would have to be taken to attain the desired tempo of work under this programme:

- i) The States of Assam, Manipur and Tamil Nadu where no CAD organisation have so far been set up either at State or project level should do so at the earliest within the organisational set up prevalent in these States to start Command Area Development works in the selected irrigation projects.
- ii) A separate department/division at the State level under a full-time Secretary/Joint Secretary Special Secretary supported by a Water Utilisation team consisting of officers from various development departments working under a separate budgetary head of accounts should be set up wherever it has not already been done.
- iii) The CAD Authority at the project level should be manned by a Senior level officer not below the rank of Commissioner/Head of Department supported by Additional/Joint Heads of the important development departments such as Agriculture, Irrigation, Cooperation etc.
- iv) The CAD Authority at project level should be directly responsible for execution of OFD works, operation and maintenance of canals and agricultural extension services and their field organi-

sations should be placed directly under them. In case of other activities, they should achieve high degree of coordination with other concerned departments/agencies.

- v) The CAD Administrator should be delegated with the powers of Head of Department of Agriculture, Irrigation and Cooperation and Director of land consolidation etc., so that he is able to exert this weight in timely implementation of the area development programme.
- vi) Adequate field units should be provided to take up and complete the work relating to surveys, planning, design and execution of OFD works, according to time bound programme.
- vii) O.F.D. works should be completed as early as possible to reap optimum benefits preferably within a period of 5 years from the creation of potential.
- viii) The field units responsible for survey, planning design and execution of OFD works should preferably be manned by agricultural/irrigation engineers to achieve an acceptable degree of quality in the work to avoid complaints from farmers and to enable easy recovery of institutional credit from the farmers.
- ix) Enabling legislation to take up construction of field irrigation and drainage channels and land levelling/shaping in commands of Government outlets on compulsory basis as also enforcement of warabandi system should be got enacted on priority basis wherever not done so far.
- x) Enactment of enabling legislation would also be helpful in the flow of institutional credit for land levelling/shaping works which are required to be done at farmers cost through institutional credit on outlet command basis.

- xi) The CAD Authority should either be set up as a statutory body so that it may be able to draw interim finance from Commercial Banks and funds from S.L.A. etc. or alternatively, a Land Development Corporation be set up to channelise the institutional finance.
- xii) Adequate priority for allocation of cement has been ensured through separate allocations for major, medium and minor irrigation projects, power projects and CAD projects for each State within their total overall quota of cement. Since last year, the supply of cement as such for CAD projects has improved but still lot of vigilance and monitoring would be necessary to ensure that they continue to keep on getting continuously their proper share of cement. The movement of coal has also been taken up with the Railway Ministry and lot of effort would have to be put in by the State/Project authorities to ensure their timely availability in accordance with the targets set out for them so that the programme of lining of field channels and construction of structures for the field irrigation channels is completed in time particularly in the projects which are being assisted by the World Bank or other foreign agencies.

CHAPTER - 5

STRATEGY, POLICIES AND PROGRAMME FOR THE DEVELOPMENT OF THE COMMAND AREA DURING THE SIXTH FIVE YEAR PLAN

5.1 The basic objectives of the CAD Programme are to bridge the gap between the creation of irrigation potential and its utilisation, to promote higher water use efficiencies, to ensure timely and adequate supply of water to each holding and to coordinate the supply of inputs including credit. The ultimate objective of all this is to increase agriculture production and yields in the command areas.

5.2 To achieve the above objectives, the primary item of physical work is the construction of field channels (Water-courses) from the outlet to each individual holding within the outlet command. The construction of field channels has to be coupled with Warabandi or rotational supply of irrigation water to ensure equitable and timely delivery of water to each farmer. Areas requiring land levelling/shaping to ensure controlled application of water would have to be covered by on farm development. Ideally speaking, the construction of field channels should be along the ridges and the fields should be re-aligned on either side of the field channels after consolidation of the holdings if circumstances permit.

5.3 Field channels along with the system of Warabandi have a number of advantages even in paddy areas where the traditional method is to irrigate by flooding from field to field. Some important advantages are:

- a) In the absence of field channels the loss of water is more and there is no certainty that each farmer would get his due share.
- b) Only the quantum of water required for the particular field, which depends on the type of crop, is applied and the water is then allowed to flow along the field channel to the next field as determined under the system of rotation (Warabandi).

c) Warabandi ensures each farmer his turn of water supply within a rotational period (one week or so) and the farmer does not have to rely on the slow process of flooding from field to field. Warabandi is possible only with a well designed net work of field channels.

d) The entire outlet command is covered much more quickly as the flow of water along a well designed and constructed net-work of field channels is faster. For example, it has been found in some paddy areas that the entire outlet command is covered in less than two weeks through field channels whereas it took more than four weeks by the old system of flooding.

e) The fertiliser used by the farmer and which dissolves in the water remains in the field and does not flow out with the water into the next field since overflow is no longer necessary and is prevented by cutting off the water when sufficient depth has been reached. Once the entire outlet command is covered, the over-flow (which may be out of the outlet command), means the plant nutrients dissolved in the water would be lost altogether. This factor would discourage farmers from using the recommended doses of fertilisers, thus keeping the yields low. Once assured of the fertiliser remaining in the fields, the farmers could be encouraged to apply higher doses, thus increasing yields.

f) In predominantly paddy areas, a second crop other than paddy can be grown without damage and wasting water if field channels are provided. Farmers near the outlet would not have to allow their fields to be flooded for reaching water to the other fields if a crop other than paddy is standing in the field. In some paddy areas, farmers dig temporary field channels during the rabi season and then cover them up during the kharif season for the paddy crop. This is a wasteful practice in terms of labour and need not be resorted to since field channels would serve both the paddy crop and other crops equally well.

5.4 The net result of the advantage enumerated above is that the utilisation of irrigation potential and agricultural yields and production would record considerable increases apart from ensuring equity in the distribution of water. It is because of this that of the total outlay of Rs.300 crores in the Central sector, it is proposed to allocate Rs. 170-crores for the construction of field channels alone. This would be matched by another Rs.170 crores from the State sector, thus bringing the total investment on field channels during the Five Year period 1980-85 to Rs.340 crores.

5.5 Once the construction of field channels and implementation of warabandi is completed, certain infrastructural facilities like agricultural extension, net work of roads for the supply of inputs and marketing of produce, regulated markets, efficient and timely supply of inputs and credit, processing industries, etc. would ensure not only considerable increases in the agricultural production from the command area but also increases in individual farm incomes and levels of employment.

5.6 In the earlier plan, considerable stress had been given to full package on farm development which was not only costly but also showed very little progress due to a variety of reasons like absence of upto-date land records, resistance of the farmers to implementation of land reforms and updating of land records, difficulties in the flow of institutional credit, inadequate organisation and machinery for carrying out on farm development works, etc. On other hand, the experience has been that once the farmer is assured timely and adequate supply of water, he himself takes up some of these works, particularly land levelling in those areas where the slopes are not very steep and undulations in the ground are small.

THE STRATEGY FOR THE SIXTH FIVE YEAR PLAN IS, THEREFORE, TO ENSURE EQUITABLE AND TIMELY SUPPLY OF WATER TO ALL THE FARMERS WITHIN EACH OUTLET COMMAND THROUGH THE CONSTRUCTION OF FIELD CHANNELS AND INTRODUCTION OF WARABANDI.

5.7 The entire organisation of the CADAs would have to be geared to this and adequately strengthened to not only achieve but attempt to exceed the targets set for the construction of field channels. Introduction of Warabandi would go

hand in hand with the construction of field channels, otherwise it would be difficult to introduce it once the farmers have got used to drawing water from the field channels entirely to their own convenience, irrespective of the needs of others.

5.8 Wherever the lands are undulating or steep, land levelling and shaping would be required for efficient use of water. This work is mainly required in Rajasthan, Madhya-Pradesh, Maharashtra, Andhra Pradesh, Karnataka and Gujarat. For lands with a slope more than 0.6 to 1%, the work would have to be done through machinery which can best be organised through Government Corporations or Departments. For this, Survey Planning and design and even execution can best be done on outlet command (chak) basis so as to be economical to the farmers and completed in shortest possible time to avoid shortfall in utilisation of irrigation potential. There would have to be an enabling legislation for taking up this work on chak basis. Topographical surveys through aerial photography and photo prints on 1:2500 scale with 25 cm contour interval would go a long way in expediting the work.

5.9 Once this is achieved the farmers would have to be educated through the extension system, demonstrations and training, the art of modern irrigated agriculture so that they are able to produce the maximum possible, given the type of land and the availability of water. Since modern irrigated agriculture involves a much larger input, both monetary and non-monetary, the training and advice given to the farmers would have to be matched by adequate and timely supply of the relevant inputs like seeds, fertiliser, pesticides, etc. and services along with adequate credit to meet the higher cost of inputs. The stress on non-monetary inputs like the time of sowing, plants population, the correct method and time of applying fertilisers, pesticides, etc. has not been much so far and would have to be emphasised to optimise the results and the returns from higher investment.

5.10 Higher production at a higher cost could mean calamity for the farmers if it led to a slump in prices and consequent reduction in net incomes. Adequate measures would have therefore, to be taken to ensure economic prices and also fair trading practices through the mechanism of support prices and regulated markets.

5.11 In some command areas, it has been found that a completely new crop, with which the farmers are not familiar, has to be introduced in view of the agro-climatic and soil conditions of the area. Special efforts are required not only to train the farmers in the art of cultivation of the new crops but also to ensure that the marketing mechanism ensures an economic price to the farmers. It may be necessary to go in for an extensive marketing and support price operation to meet the needs of the situation. Even this may not be sufficient if the new product calls for new processing industries to ultimately make the product acceptable to the consumers. The CAD Authority would have to take stock of the situation and act as a catalyst in setting up the new processing industries in the area or in a near-by place. As a specific example, we may quote soyabean. This has been introduced in the Tawa Command of MP, since the area was considered unfit for paddy or other traditional irrigated kharif crops. Since Soyabean is not easily acceptable because of processing difficulties, the marketing organisation of the State had to go in for a massive support price operation. Extraction of soyabean oil is a fairly sophisticated process and hence efforts are now being made to set up a solvent extraction plant in the area through the Cooperative Marketing Federation.

Conjunctive Use of Ground Water

5.12 In many of the command areas the irrigation has been in existence for the last 30-40 years or more and consequently the ground water table has risen. Water logging is a major negative out fall of irrigation. This disadvantage could be a blessing in disguise if farmers are encouraged to go in for tubewells or dug wells to exploit this additional source of water. Farmers should be encouraged to go in for tubewells/ dug wells on their own for which the credit machinery would have to be geared up. An experiment made in Rajasthan, known as "Credit Melas" has proved to be very successful in stepping up the flow of institutional credit for wells. Similar innovation could be resorted to in other command areas. Medium, Small and Marginal farmers would be entitled to subsidy on the usual scale for which Central assistance on a matching basis would be available to the State Government. Development of ground water would not only make possible a second or third crop but would also help in "vertical drainage" to keep

their watertable low and thus prevent soil salinity/water logging. Successful implementation of the concept of conjunctive use of ground water would lead to considerable increase in production and farm incomes. Besides individual wells, the Irrigation Department should also consider sinking of deep tube-wells for augmenting canal supplies. Even saline water mixed to a certain extent with fresh water from the canals could be used to augment irrigation supplies.

Inclusion of New Projects

5.13 While considering the Memorandum submitted to it for the new pattern of financing the Centrally Sponsored CAD Programme on 24th January, 1980 the Expenditure Finance Committee decided that no more new projects should be added to the programme and all efforts and expenditure must be concentrated on the 76 Irrigation Projects already selected. The Working Group felt that by its very nature the CAD programme should be extended to new irrigation projects as and when some potential is created and it is mature for the intensive development envisaged under the programme. The resources with the State Governments generally do not permit taking on the programme entirely with their own resources and yet the need for this type of a programme was strongly felt in the new irrigation projects. The Working Group, therefore, recommends that the restriction on inclusion of new projects under the Centrally sponsored CAD Programme may be removed subject to the condition that the expenditure on the new projects would be met from the allocation of Rs.300/- crores in the Central Sector.

CHAPTER 6

OUTLAYS, PHYSICAL TARGETS, COMPONENTS OF THE PROGRAMME AND THE PATTERN OF CENTRAL ASSISTANCE

6.1 The targets for the main items of work, namely field channels and the area to be covered by land levelling and shaping, were fixed at four million ha. and 1.4 million ha. respectively in the Report of the Working Group for the CAD Programme for the Five Year Plan 1978-83. The target for field channels is proposed to be enhanced to 4.5 million ha. during the Sixth Five Year Plan and the coverage under land levelling and shaping 1.1 million ha. The reduction in the target for land levelling and shaping is mainly due to the fact that the area required to be levelled is now estimated to be less. Experience has also shown that once the farmer is assured of water at his field he himself takes the initiative to level his own land with his own resources and at a pace that is within his means. Details of the State-wise and year-wise targets for these two items are given in Appendix VIII.

6.2 During the last few years considerable areas have been covered with detailed topographical and soil surveys and hence it is proposed to utilise the field units more for the construction and supervision of field channels and supervision of OFD works. Where the area covered by survey is far more than the area covered by field channels/OFD works, a certain amount of slowing down in the survey programme is envisaged.

6.3 Some new items were added in the Report of the Working Group on CAD for the Five Year Plan 1978-83 for qualifying for Central assistance. These were adaptive trials, rabi crop compensation, warabandi, training of farmers, staff and demonstration. The Memorandum for the Expenditure Finance Committee also provided for these items on a matching basis with the State Governments. Some changes were made by the Expenditure Finance Committee (EFC) in the pattern of financing and one item was not approved by it. The item not approved was socio-economic surveys to be conducted by the State Governments/projects to assess the socio-economic benefits from the programme, like increase in farm incomes, increases in employment a better deal for the small and marginal

farmers, etc. The Working Group feels that there should be a regular and systematic evaluation of the merits and demerits and benefits emerging from the CAD Programme. While the project Economist and his staff would supervise bench mark surveys and generate data for computing the quantifiable changes brought about by the Programme, it would be necessary to entrust the work of analytical evaluation to some independent agency which would be able to derive conclusions and suggest remedies, if any, required, on the basis of the data so collected and generated. It is felt that objectivity can not be presumed on the part of the project staff who are collectively responsible for the implementation of the programme. Such an evaluation study may be necessary once in a four or five year period in each project. To ensure that such evaluation does take place, Central assistance on a matching basis should be extended for such expenditure. The cost during the entire Five Year period on the 76 irrigation projects under 43 CADAs may not exceed Rs. one crore in all of which Rs.50 lakhs would come from Central assistance and the remaining Rs. 50 lakhs from the States. It may be mentioned that similar provision already exists under the existing programme for conducting inter-State or regional studies directly by the Central Government.

6.4 The total outlay indicated by the Planning Commission for the Central Sector is Rs. 300 crores during the Sixth Plan. The State outlay is estimated at Rs.379 crores and the institutional outlay at Rs.110 crores.

6.5 The changes made in the pattern of financing by the EFC are as follows:-

- i) The Department of Agriculture had proposed grants to the extent of 50% of the cost incurred on field channels to be matched by a similar contribution by the State Government. In other words, the cost of construction of field channels would be borne entirely by the Government and would not be recovered from the farmers. The EFC modified this to the cost being met to the extent of 50% but this would consist of 25% as a grant and 25% as a loan.

ii) Equity capital support was extended to the Land development Corporations, Ground Water Development Corporations, Farmers' Service Societies, CADAs on the equity base, etc. from 1974 to 1979. The EFC modified this to loan to the State Government concerned which, in turn, would contribute to the equity of the Corporation alongwith its own share. In other words, the entire equity would now on be contributed by the State Government while the Government of India would make half the amount available as a loan to be recovered over a 15 year period with the rates of interest fixed by the Ministry of Finance from time to time.

6.6 Regarding the pattern of financing the construction of field channels, many State Governments have expressed the view that the entire assistance should be made available in the form of a grant since recoveries of the loan warranted maintenance of elaborate individual accounts for a small amount, for a very large number of farmers over a fairly long period. In those areas where land levelling and shaping was a must two sets of accounts would have to be maintained for recovery for each farmer, one for the institutional loan and the other for the government loan for field channels. This would considerably increase the work load and paper work and the administrative cost would not be commensurate with the amount to be recovered. Many States feel that it is not practical to enhance the water rate in lieu of recovery of the loan as enhancing water rate has may other ramifications. If the State did not recover the loan it would mean that while the State Government contributed 75% of the cost the Government of India would have contributed only 25%.

6.7 Some States have protested against the unilateral withdrawal of equity participation by the Govt. of India from the State Corporations involved in the CAD Programme since most of these were set up expressly because 50% equity was offered by the Central Government. In the case of Rajasthan the agreement with the World Bank for assistance to the Chambal CAD Project provided for 50% participation by the Government of India to the extent of Rs.5 crores. The Government of Rajasthan feel that effectively the Government of India is going back on its commitment to the World Bank.

6.8 The Working Group considered the above changes made by the EFC in the pattern of financing and recommended that the assistance for the construction of field channels may be given entirely as a grant on a matching basis. With the recommendations that the water rates may be suitably increased, while the change made for equity capital support may be allowed to continue.

6.9 The components of the programme for purposes of Central assistance would be as follows:-

Central Assistance in the form of Grants on a
50 : 50 Matching Basis

- i) Cost of Estt. of CAD Authorities and State Level CAD organisation.
- ii) Soil/Topographical surveys, planning, design and supervision of OFD works.
- iii) Studies to evaluate the benefits from the CAD Programme.
- iv) Introduction and implementation of Warabandi.
- v) Rabi crop compensation for taking up OFD works during the rabi season.
- vi) Subsidy to medium, small and marginal farmers as under the IRD Programme for OFD works and Ground Water Development.
- vii) Construction of field irrigation channels including necessary structures and the lining of initial vulnerable reaches.
- viii) Adaptive trials, training of project staff and farmers in better water management and cropping practices through demonstration and visits to more developed areas, setting up of demonstration farms and training centres in the command areas.

Central Assistance in the form of Loans on a
Matching Basis for:-

- ix) the purchase of machinery and equipment for taking up of OFD works.

- x) Special loan fund with the ARDC for ineligible farmers.
- xi) Equity capital contribution by the State Government to the Land Development Corporations, Corporations for the development of ground water, farmers' service societies and CADAs etc.

The outlay on each item is given in Appendix IX.

6.10 In the Memorandum submitted to the EFC, the Department of Agriculture and Cooperation had proposed an expenditure of Rs.50 lakhs for conducting Seminars, workshops, training and special studies directly by the Central Government and an equal amount (Rs.50 lakhs) for strengthening the Water Management Division and the Sectt. Estt. in the Department. The EFC approved Rs.50 lakhs for the Seminar, workshops etc. and Rs. 20 lakhs for the strengthening of the Water Management Division. It is proposed to keep the same figure of Rs.50 lakhs for Seminars Studies and consultancy. It is felt that for better attention and quicker implementation of certain aspects of the CAD programme like Warabandi, economical land development etc. individual attention through Consultants is necessary. The panels of Specialists in various fields should, therefore, be drawn up for being appointed as short term Consultants.

6.11 As for the strengthening of the Water Management Division, the estimate of Rs. 20 lakhs was for three years since the first two years of the Five Year Plan 1978-83 had lapsed by the time approval of the EFC was sought. Considerable difficulties are being faced in the day to day working of the Division and CAD Section due to lack of modern office equipment. The work involves preparing elaborate charts and statements to project the progress of works or expenditure incurred. It also involves reproducing diagrams for preparing technical bulletins. All this calls for a modern photocopying system with its accessories. It is proposed to spend a small amount, about Rs.3 to 4 lakhs during the Five Year period to modernise office equipment in the Division. The Staff for the WMD would also now have to be paid for the entire five year period. These together would require about Rs. 50 lakhs during the Sixth Plan period. The provision for strengthening of the WMD, the Sectt. Estt. and modernising office equipment is, therefore, proposed at Rs.50 lakhs.

CHAPTER 7

INSTITUTIONAL FINANCE SCOPE, OUTLAYS AND
SIMPLIFICATION OF PROCEDURES

7.1 The Command Area Development Programme, as at present, was conceived as a Centrally Sponsored Scheme during the Fifth Plan Period. Initially, it was envisaged that the cost of construction of field channels and on farm development works would be met from institutional sources as it was then considered to be the farmers' responsibility. However, considerable difficulties were faced in mobilising institutional finance due to a multiplicity of factors. The most important of these were (i) the necessity of taking up the works in the entire outlet command at a time, (ii) reluctance of some farmers to being burdened with a loan and (iii) ineligibility of some farmers for taking institutional loans due to heavy overdues or defective title to the land. Besides these, the procedures laid down by the lending institutions were also very elaborate and involved considerable paper work covering each and every farmer. To overcome some of these difficulties, particularly those relating to ineligible/unwilling farmers, it was necessary for the State Government to enact legislation which also took considerable time. Another difficulty was the legal status of the agency for executing land development works. In many cases, government departments were doing the work, particularly the work of construction of field channels, and the departments of Government were not entitled to draw and channelise institutional credit. A statutory body or Corporation, a registered society or a Corporation under the Companies'Act was required for the purpose. All this took considerable time in being set up or organised.

7.2 In view of the tardy flow of institutional credit due to the above reasons the Government of India decided to extend assistance in the form of loans for the construction of field channels to the extent of 100% of the cost. The loans were recoverable over a period of 15 years from the State Government but the State Government in turn could recover it in a shorter period from the farmers and use the loan as a sort of revolving fund. Considerable head-way was made in the construction of field channels through this loan particularly in U.P. The States which availed of the

loan from the GOI had to arrange for institutional credit for land levelling and shaping and for the construction of field drains and farm roads. The flow of institutional credit during the Fifth Plan period (1974-78) was only Rs.8.23 crores against an estimate of about Rs.200 crores that had been made while formulating the Plan.

7.3 During the last few years many States have overcome the difficulties mentioned above. They have enacted legislation and have also set up Land Development Corporations to execute OFD works in the command areas. The result is that during the year 1978-79 and 1979-80 the disbursements of institutional credit went upto Rs.12.44 crores (Appendix III).

7.4 As described in Chapter V and VI, the construction of field channels has been practically taken out of the purview of institutional credit and the entire target of 4.5 million ha. is expected to be financed through budgetary funds under the Centrally Sponsored CAD Programme, the total amount (Rs.340 crores) being shared equally between the centre and the States. The scope of institutional credit in the CAD Programme is, therefore, now confined to land levelling and shaping works and the construction of field drains where necessary. In some cases farm roads are also taken up as part of the OFD works financed through institutional credit. Apart from being practically the only source of financing/land levelling and shaping works, other than the farmers own resources, institutional credit assumes importance in the context of World Bank/external assistance for CAD Projects since the assistance covers reimbursement to the ARDC for refinancing OFD works.

7.5 Lengthy procedures, particularly unduly detailed and complicated forms, have been simplified over the last few years and even interim finance is provided to the executing agencies, subject to satisfying certain conditions, for taking up the works immediately without waiting for individual documents or consent bonds being obtained. The simplifications brought about are as follows:-

- i) Application form and consent letter have been combined so that the latter will form part of the loan application.

- ii) Application form-cum-consent letter also includes declaration under the relevant enactment in the State relating to provision of facilities for agricultural credit by banks (Talwar Committee).
- iii) Provision of interim finance pending collection of application forms and identification of ineligible farmers. Under this arrangement the participating banks can disburse to the implementing agency interim finance in suitable instalments say 2 to 4 on the basis of anticipated expenditure to be determined with reference to a firm work programme on a half-yearly/annual basis. A detailed procedure for the purpose has been laid down.
- iv) To enable the participating banks to take up and complete as early as possible, with the assistance of implementing authority, the classification of farmers into the categories of eligible and ineligible farmers, the categorisation of ineligible farmers has been restricted to unwilling farmers, heavy defaulters or farmers with major defect in title or value of mortgage. Others with slight defect in title or shortfall in security or defaulters to a restricted amount can be categorised as eligible and given bank loans against Government guarantee.
- v) The interim finance is available on a pro-note on Government guarantee.
- iv) Ad-hoc loans on Government guarantee are also made available to the implementing authority in respect of completed works of on-farm development where categorisation of farmers into eligible and ineligible has not been completed subject to the categorisation and adjustment of ad-hoc loan within a period of 12 months.

7.6 To be able to realise the expeditious flow of credit under the simplified procedure, following requirements have to be fulfilled:

- i) implementing authority i.e., LDC or CADA has to be an autonomous corporate body with powers to borrow from banks;
- ii) the relevant land development act empowers the LDC/CADA to carry out the work on a compulsory basis;
- iii) the LDC/CADA should have statutory powers for creating prior charge on the land proposed to be developed and such a charge should be transferable to the financing bank under the Act;
- iv) there should be legislation on the lines of recommendations of Talwar Committee for provision of facilities for agricultural credit by banks; and
- v) the LDC/CADA should prepare a firm works programme on half-yearly/annual basis for drawal of interim finance.

7.7 In most cases tripartite or bipartite agreements have been signed between the State Government, the executing agency and the Commercial Banks/ARDC which clearly lay down the roles to be played by each and the procedures to be followed. It is expected that the exercise which has taken about four to five years to complete would now yield results and the flow of institutional credit would considerably improve during the 6th Plan period. This expectation is already borne out by the improvement noticed during the last two years, 1978-80 (Appendix III).

7.8 It has to be borne in mind that notwithstanding the considerable simplification and enactment of legislation by the States, there is a limit upto which this can be done since certain minimum norms of safety have to be observed by the lending institutions if they are to continue to be an active partner in the programme. Insistence on over simplification and also not adhering to some minimum collateral/sureties may lead to disaster for the banking system. We are fully aware of the state of the cooperative banking system in most of the States in the country.

7.9 We have fixed a target of 1.1 million ha. for land levelling and shaping to be financed mainly through the institutional sector. The costs vary widely from project to project, depending on the soil conditions, slopes, cost of labour, nature of earth moving equipment to be used, etc. However, for purposes of projecting the cost, we may assume that land levelling and shaping would cost about Rs. 1500 per ha. on an average. If the entire cost is to come from the Institutional Sector, the latter would have to provide about Rs.165 crores for the purpose. However, with the emphasis on construction of field channels without waiting for land levelling and shaping and on ensuring delivery of water to each field, it is likely that a considerable part of the land to be levelled would be done by the farmers themselves from their own resources and through locally improvised methods. Some 20 to 30% of the land would be owned by ineligible farmers who would normally not be entitled to institutional credit, except from the Special Loan Fund with the ARDC. Since resort to legislation and coercion would be kept to a minimum in view of the changed strategy (that is, construction of field channels without insistence on full package OFD), the actual requirements of institutional credit may not exceed Rs.110 crores. In addition to this about Rs.12 crores would come from the Special Loan Fund as the Central and State Governments' contribution. Presuming that about 40% of the land would be owned by medium small and marginal farmers who would on an average be entitled to 25% subsidy for land levelling and shaping works, about Rs. 12 crores would come as subsidy. Thus the total outlay from these three sources on land levelling and shaping would be Rs. 134 crores. It may be borne in mind that if coercion or resort to legislation is kept at a minimum, the need for the Special Loan Fund would be very little. Only those farmers who sincerely desire that their lands be levelled and yet have heavy over-dues or defective titles to the land would need to be covered from this Fund. Projects where consolidation is compulsory with OFD works would also need financing from the Fund as OFD works would automatically become compulsory.

7.10 The present system of financing the ineligible farmers is that the participating Commercial banks after due approval of the schemes by the ARDC finance the works on the farms of ineligible farmers alongwith the eligible farmers. Separate accounts are maintained by the executing

agencies for submitting to the bank since rates of interest and other procedures are somewhat different. The participating commercial banks in turn get 100% reimbursement from the ARDC from the Special Loan Fund. The Special Loan Fund is maintained for each State separately since the State Government concerned has to contribute 37.5% of the amount required. Another 37.5% is contributed by the GOI. The ARDC itself contributes 25% of the requirement for this fund. The interest paid to the GOI/State Government by the ARDC on this deposit is 7.3/4% with a rebate of $\frac{1}{4}\%$ for prompt payment. The ARDC gives it to the Commercial banks at an interest of $9\frac{1}{2}\%$ which in turn gives it to the executing agency for $10\frac{1}{2}\%$. The Executing Agency charges 13 or $13\frac{1}{2}\%$ from the ineligible farmers. Thus the Commercial Banks retain 1% as their margin of the amount to be routed through them. The Government of Rajasthan and the Rajasthan Land Development Corporation (RLDC) have been pressing the Central Government to directly contribute to the Special Loan Fund which would be maintained by the RLDC. The main reason for taking this view is that the amount has to be backed by Government guarantees and the RLDC is also responsible for recovery of the amounts from the farmers. Thus no positive role is played by the ARDC and the Commercial Banks as far as the Special Loan Fund is concerned. Since the entire work is done by the RLDC, it feels that the amount should be directly made available to them at 7 $\frac{1}{2}\%$ and it should be allowed to keep the entire margin and/or charge less interest from the farmers.

7.11 There are certain advantages in maintaining the SLF with the ARDC and routing it through the Commercial Banks. The eligibles could become eligible in due course by clearing their dues or rectifying their titles or by consenting to take a loan. In that case the banks would automatically transfer their amounts to the normal system. If, as suggested by the RLDC, interest rates for eligibles were to be made less than the eligibles, the latter category would soon disappear. The higher rate of interest acts as a deterrent and hence the eligibles would soon like to become eligible. Since the question of financing eligibles arises only where all farmers are to be covered the financing agency should also be the same and not be split between the bank and the executing agency.

7.12 Institutional credit would also be required for financing groundwater development. The problems in this case are not many and hence are not considered in detail. Assessment of outlays has also not been attempted as no definite targets have been set. The organisation of "Credit Melas" or camps would go a long way in mobilising credit by bringing together all those concerned in the process of disbursement of credit at one place after due publicity in the villages to be covered.



CHAPTER 8

INFRA-STRUCTURE DEVELOPMENT

8.1 The pattern of financing the CAD Programme through the Centrally Sponsored Scheme revolves around the most fundamental objective of Command Area Development, namely, faster utilisation of irrigation potential and better water management. The Central Government also shares the cost of establishment of the CAD Authority which is expected to coordinate, orchestrate and catalyse the process of integrated development but does not support financially the creation and maintenance of the infrastructure essential for complete development of the area. Some of the important items which comprise the infra-structure are a well regulated and maintained irrigation system, drainage, roads which help fast movement of inputs to the farms and the movement of produce to the markets, regulated markets where farmers are assured a fair price for their produce given the market conditions, an intensive agricultural extension system, an efficient and adequate machinery for meeting the credit needs of the farmers, etc.

8.2 The most fundamental infra-structure for a CAD Project is the irrigation system. Its upto-date maintenance and efficient operation is of the utmost importance. In the older system modernisation of the canals and regulating structures may be a pre-requisite for successful implementation of the CAD Programme. The efficient operation of the canal system can be achieved through sophistication for which a separate wing in the Irrigation Department for operation and maintenance would go a long way in utilising the experience and training of the staff.

8.3 Maintenance of field irrigation channels is as important as its construction for optimum utilisation of created irrigation potential. It has been observed that the maintenance of field channels in majority of the irrigation projects is not adequate. The farmers are expected to maintain field irrigation channels. Provisions exist in almost all the States to get proper maintenance carried out in case the farmers fail to do so. But this provision has seldom been enforced mainly because the work involved is huge and it is

difficult to get the works carried out in a short period available for the purpose. It would therefore be essential to organise the farmers for taking up maintenance of field channels and other O.F.D. works of community nature. The farmers may be organised into outlet committees and made responsible for taking up timely maintenance of field channels. The cost may be shared through labour or cash organised and collected by the outlet committees for taking up the maintenance work. To take up maintenance of lined field channels and the pucca structures it may be necessary to organise farmers into minor-wise committees. For this purpose a mason may be engaged on full/part time basis by the minor committee and the repairs taken up on collective basis and cost shared.

8.4 No irrigation system is complete without an adequate network of drains. It is important that the drainage network is completed as early as possible and well maintained, particularly in water-logged areas. Excess water is bound to occur at some time or the other, particularly where protective irrigation is given during the monsoon season.

For the healthy growth of crops only the appropriate quantity of water should be in the soil and any excess should be drained out. The CADAs, in consultation with the irrigation wing, should ensure adequate staff and funds for both construction and maintenance of the drainage system by taking it up with the State Government.

8.5 The basic policy for building up the infra-structure had been laid down during the 5th Plan period. It was envisaged that expenditure on these items would be met from the usual sectors, like the State Plan, normal financial institutions, autonomous organisation (for regulated markets), etc.

8.6 The importance of an adequate and well planned net work of roads to facilitate timely and fast movement of inputs and agricultural produce through-out the year is fundamental not only to ensuring higher production but also for ensuring adequate returns to the farmer for his labours. The State Government in consultation with the CAD Authorities should ensure that the State Plan provided for adequate outlays and that the net work of roads comes up systematically within the Command Area. The authority is expected to prepare the plan for the net work of roads in consultation with

the PWD and lay down the priorities for taking up actual construction.

A Technical Group was set up by the Planning Commission to recommend norms and specifications for Ayacut roads. They have recommended that Ayacut roads should include the main roads to market centres which would be of ODR category (other district roads and the roads linking the villages to ODR). It has also recommended that the Ayacut roads should be so planned that within the command area the distance of any village from the nearest road is not more than 1 km. This would mean a road density of approximately 100 kms. per 100 sq.kms. of the area. Specifications with regard to their construction and maintenance are given in annexure.

8.7 The T&V system of Agricultural Extension assisted by the World Bank is under implementation in many States. Those States which have been included under this scheme should ensure speedy implementation. In particular, it should be ensured that the entire staff sanctioned for the project is appointed and are not subjected to frequent transfers. Adequate facilities for training the extension staff should also be set up. Some assistance is available under adaptive trials and training of field staff under the Centrally Sponsored Scheme. In those States where the T&V system of extension has not been formally introduced, the State Government in consultation with the CADA's should set up an adequate machinery on similar lines with modifications warranted by local conditions and experience, if necessary. The important point to be kept in mind while setting up an extension machinery or strengthening it is that the number of farming families to one VLW should not be more than 500. It has to be borne in mind that modern irrigated agriculture calls for more intensive practices and that problems with which the farmers are not familiar crop up very frequently. The Extension machinery in irrigated areas should, therefore, be much larger than in unirrigated areas. The machinery should not only render correct advice at the right time but a sense of responsibility should be attached to the advice otherwise farmers may be put to heavy losses and the creditability of the Extension machinery would be lost.

8.8 Central assistance to the extent of Rs.5 lakhs per market is available under a scheme of the Ministry of Rural

Reconstruction for setting up regulated markets in the command areas of irrigation projects subject to some conditions being fulfilled like the availability of land and the assurance of credit for taking up construction. Marketing Committees (Krishi Upaj Mandi Samities) should be set up under the State legislation on the subject and under the overall guidance and catalytic effect of the CAD authorities they should be made to function properly. In some States the revenue earned by the marketing committees is used for building link roads and other facilities for the farmers. In those areas where this is not being done the CADAs could make efforts to get some works started provided the resources permit.

8.9 With the advent of irrigated agriculture the needs of inputs goes up considerably not only in quantity but also in the variety of inputs. Most farmers have usually the traditional seeds for the crops grown by him, which is nothing but part of the produce of the previous year. With irrigated agriculture improved seeds have to be used along with high dose of fertilisers and pesticides, in some cases, to get the maximum out of the irrigation facility. Farmers not only do not have these with them they also do not have the means to purchase them. It is absolutely essential that short-term credit is made available to him for purchasing the inputs. It is also necessary to ensure that the relevant inputs, based on the advice given by the Extension Machinery, are also available at the right times, in the right quantities and at controlled/reasonable prices. The CADAs would have to make an assessment of the requirements of the various types of inputs and the corresponding requirement of credit and take it up with the organisations concerned to ensure adequate and efficient supply. The points of storage, the quantities to be stored at each point of storage the location of branches of Commercial Banks/Cooperative Bank may have to be determined by coordination between the CADAs and the management of the marketing organisation/banks.

8.10 With higher production, the marketable surplus of agricultural produce from the area would come up considerably, necessitating adequate storage facilities for the produce. The Ministry of Rural Reconstruction have a scheme for the construction of rural godowns in which Central assistance to the extent of 25% of the cost is available as a

grant to be matched by another 25% from the State Government. The balance 50% is to be met from institutional sources. A well conceived programme for the construction of a net work of godowns should be drawn up by the CADAs and implemented through a suitable agency keeping in view the instructions/guidelines issued by the Ministry of Rural Reconstruction.

8.11 An important item of infra-structure, which very often goes by default, is the need for in-service training of the personnel. Irrigation/Agricultural Engineers, Agronomists, Soil Scientists, etc. and their lower formations should be adequately trained and oriented to the new need of modern irrigated agriculture. Whenever new personnel are posted to a CAD project or for operation and maintenance of irrigation system, they should be put through re-orientation-cum-training course so that they are fully aware of the different needs of the project as compared to their past experience in other areas.



CHAPTER 9

BENEFITS OF THE PROGRAMME AND ITS BENEFIT - COST ANALYSIS

9.1 It has already been high-lighted that the main objectives of the programme are to increase the utilisation of created irrigation potential and better water management and distribution. Through these we expect to achieve higher production, alongwith the other components of the package, and increase individual farm incomes.

9.2 A number of factors are responsible for the lag between the potential created and its utilisation. The major among them is the absence of field irrigation channels beyond the government outlet. Even where these channels have been constructed all farmers do not get an equitable share due to the absence of warabandi as has already been discussed in Chapter Four.

9.3 It is some-what difficult to quantify the increase in utilisation over a given period of time due to the construction of field channels alone since some increase in utilisation does take place in the normal course due to the farmers' own initiative, although limited. The problem is even more difficult in those irrigation projects where the process of creation of irrigation potential is still continuing since areas in which potential has been newly created would be utilising some of it in the normal course and some more of it due to the efforts under the CAD Programme. Precise figures can be obtained for specific areas only through a scientific and systematic study of the situation prevailing before taking up CAD works and one or two years after these have been implemented in the area. Data regarding such studies are not readily available with us.

9.4 In the light of the above difficulties, we may assume for simplicity that the rate of utilisation of irrigation potential would have continued to be the same in the coming years as during the immediately preceding period, then the increase in percentage utilisation of the potential created could be attributed to the efforts made under the CAD Programme. An attempt has been made to analyse the increase in the potential in the selected irrigation projects in which CAD Authorities have been set up during the Fifth Five Year

Plan and the years 1978-80, which is given in Appendix VII. It can be seen that as a result of the CAD Programme the increase in utilisation is of the order of 13 lakhs ha. Over a six year period (1974-80) against the direct investment of Rs.286.92 crores (Rs.120.51 crores under Central Sector, Rs.145.76 crores under State Sector and Rs.20.65 crores from the Institutional Sector) over this period. This means that additional area has been irrigated at a cost of Rs.2207 per ha. by way of increased utilisation which is substantially lower than the investment (about Rs.10,000 per ha.) which would be required to be made on the creation of new irrigation potential. During the Sixth Plan period it is expected that the projects' potential in almost all the projects selected during the Fifth Five Year Plan would be reached. The construction of field channels in about 4.5 million ha. would result in increased utilisation to the extent of about 1.6 million ha. In paddy areas the construction of field channels coupled with warabandi could lead to a saving of water between 25 and 30% which could be used either to cover larger areas or increase the intensity of irrigation in the existing command. It may be pointed out that in most of the paddy areas utilisation is nearly 100% without constructing field channels since the entire outlet command is flooded for irrigating every field. To make sure that water reaches the last field excess water has to be kept standing in the fields near the outlet.

9.5 The programme during the Sixth Plan envisages construction of field channels in an area of 4.5 million ha. while land levelling/shaping would be carried out in an area of 1.1 million ha. The total outlay visualised on the programme is Rs.740 crores. Some benefits from part of this outlay incurred in the form of improved soil and water management, crop planning, extension, etc. would also accrue in the remaining command area (about 10.5 million ha.) that is outside the 4.5 million ha. to be covered under OFD works, but for the present economic analysis it is assumed that the entire outlay would be concentrated in the development of 4.5 million ha. The cost of development including supervision thus works out to Rs.1780 ha.

9.6 As a direct consequence of implementing the programme not only the productivity per crophectare would increase but also the intensities of irrigation and cropping.

The crop patterns in the command areas would undergo an appreciable change with a bias towards high value cash crops or superior food crops. The increases in yield actually obtained in some of the projects covered by the CAD Programme as a result of the integrated command area development are given in Appendix X. The variation in the increases is accounted for by a number of reasons. viz., the figures relate to differing number of years since development was carried out (normally it takes about five years from the completion of OFD works to attain full production level), higher initial base figures where the farmers are progressive, scope in some of the minor cereals being limited, etc. It may be mentioned that once there is an assured supply of water and inputs, a shift will take place in favour of superior cereals and/or cash crops. For evaluating the likely benefits from the programme it is proposed to confine our computations to the four major cereals/millets; Paddy, Wheat, Maize, Jowar.

9.7 The average production per ha. before development was 20.22 Qtls. which increased to 28.24 Qtls. after development. The increase in production is, therefore, about 8 Qtl/ha. It may be added that in practically none of the existing CAD projects has full development taken place either from the point of view of coordinated supply of inputs and assured supply of water or from the point of view of transfer of technology. In very few areas in the selected commands would five years have lapsed after OFD has been done since for all practical purposes work had really begun to pick up since 1976 while full development is reached after five years. In areas where the top soil layer is not very thick the period is even longer. Once full development is achieved the increase is likely to go up to about 12 Qtl/ha. on a modest estimate. This assumption is justified by noting some of the increases, e.g. increase in Kharif Paddy production from 21 Qtl/ha. to nearly 42 Qtl/ha. in the Chambal (Rajasthan) Project. It may be noted that the highest level of production in the projects are in the range of 40 to 45 Qtl/ha. With modern technology combined with scientific water management yield levels up to 50 to 60 Qtl/ha. have been achieved in the more agriculturally developed countries. Achieving these levels would warrant considerable increases in infra-structure and other facilities which would take considerable time to organise and put

on the ground. For our present analysis we will assume only the increase of 8 Qtl/ha. mentioned above, in the 4.5 million ha. to be intensively covered under the programme.

9.8 In the foregoing para we have only considered the increases in production per ha. of cereals millets in a given crops season over the base figures. More precisely, we should consider the increase in production from a given area per year, since on implementation of the programme the gross cropped area is likely to increase and two crops may be raised where only one was being raised so far. In the case of Paddy areas where the present utilisation is reported to be 100% the saving of water due to construction of field channels could be used for the next season in a storage scheme or the command area could be extended in the case of a diversion scheme. This would also lead to more irrigated crops and consequently higher production. Though the cost of development of land would remain the same and even one crop season would yield higher production, the individual farm income would be more than proportionate due to higher intensities of cropping and also due to shifting over to more high return crops. However, only a modest projection will be made by us by considering only the increase in terms of one crop season per ha. as if it were the only increase during the entire agricultural year.

9.9 The value of the extra 8 Qtl/ha. production may be conservately assumed as Rs.1,000 (actual market prices are much higher than Rs.125 per qtls). The cost of additional inputs is estimated at 30% of this value which leaves us with a net value of the incremental produce at Rs.700. This benefit is assumed to accrue from the 2nd year onwards. The additional cost of maintenance involved to ensure efficient water delivery is reckoned at Rs.50 per ha. per year.

9.10 On the above assumptions, with the opportunity cost of capital at 11% per annum, the benefit cost ratio works out to 2.82 for a period of 25 years (Table shown on next page), without taking into account the residual value of CAD works at the end of the 25 years period (In fact, there will be little depreciation in the CAD works over the course of time).

TABLE

Year	Cost per ha. (Rs.)			N.P.W. of Cost (Rs.)	Benefit per annum	N.P.W.* of Benefit
	Capital	O&M	Total			
1	1780.00	-	1780.00	1603.80	350.00	315.40
2-25	-	50.00	50.00	376.20	700.00	5266.80
				1980.00	5582.20	
					Benefit Cost Ratio <u>5582.20</u>	=2.82 1980.00

*Net Present Worth.

9.11 It may be mentioned that the actual return to the farmers in terms of net farm income would be much higher since he would go in for an appreciable percentage of high value and high return crops, once he is assured of adequate and timely supply of water and inputs and his land has been developed to receive irrigation. His income would increase due to the following three important factors:

- 1) Higher intensities of cropping due to higher intensity of irrigation.
- 2) Increased yields per ha. during any particular crop season, and
- 3) Higher net return from the new varieties of crops, particularly cash crops grown.

9.12 The major fall out of the entire programme, apart from the ostensible objectives of higher production per crop ha. per year, is the considerable increase in rural employment. Due to higher intensities of cropping and shift to crops requiring more intensive practices, farm employment would increase considerably. For the small and marginal farmers it would mean fuller employment on their own farms while in the case of agricultural labourers it would mean more man days of work during the year. Since modern irrigated agriculture is essentially based on high input technology, supply of inputs to the command areas would increase considerably

which would also add to more employment for the service sector. Banking and other activities would also increase. Similarly, there would be much more to transport at harvest time and process before the food finds its way to the consumer. Agricultural processing industries, storage, transport and trade, etc. would increase substantially bringing about fuller employment and economic well being to the rural areas. It is difficult to quantify all these advantages in the absence of reliable data but there is no doubt that the benefits would substantially outweigh the cost of programmes.



CHAPTER-10

EMPLOYMENT AND ACCRUAL OF BENEFITS TO THE SCHEDULED CASTES/TRIBES

Employment

10.1 With rising unemployment in the country, it is important a major investment should also aim at higher employment for the people in the areas for which the Programme is intended. The massive investment in the construction of field channels to the tune of Rs.340 crores would be substantially used for paying wages to labourers or semi-skilled workers. It is difficult to quantify in terms of man-months or man-years the employment potential of this investment since the productivity of labour varies widely from place to place. Secondly, the proportion of this amount that would be spent on water alone and the proportion that would be used on purchase of materials would also vary widely.

10.2 Apart from the construction of field channels employment could also be generated through the work of land levelling and shaping through institutional finance. The estimated investment is of the order of Rs.134 crores. Again, a substantial part of this would be in the form of wages.

10.3 The employment potential for complete on-farm development including construction of field channels, field drains and land levelling/shaping, though of a non-recurring type will have to be continued for several years to come since the CAD Programme itself is a continuous one. Complete on-farm development requires about 180 man-days per ha. Similarly, construction of field channels requires 50 man-days per ha. The Command Area Development Programme under the Sixth Plan provides for construction of field channels in 4.5 million ha. and land levelling and shaping in 1.1 million ha. On an average, field channels will be constructed in 1.05 million ha. per year in 1984-85 against the present rate of 0.5 m.ha. and land levelling/shaping in 0.27 million ha. per year in 1984-85 against the present rate of 0.1 million ha. On the above basis, the additional employment generated for construction of field channels and land levelling/shaping, will be 47 million man-days per year during the Sixth Plan period.

10.4 Command Area Development activities extending to improvement in the delivery system and also in the construction of a net work of drainage would also lead to employment of labour and semi-skilled workers.

10.5 All this would be a one time job but the work of maintenance would increase and thus permanent employment potential could be created through the activities under the programme.

10.6 The expenditure to be incurred on the establishment of the CAD Authorities and the surveys, adaptive trials etc. would also create employment. This would be mainly in the skilled jobs in the fields of engineering, soil conservation, Agronomy, Administration, etc. Assessing the exact number of man-years of work created is difficult since pay scales, norms of employment and organisational structures vary widely from State to State.

10.7 All the above are as a direct result of the investment to the tune of Rs.800 crores on the programme. The most important source of employment as a result of the development activities would be the increased activity on the agricultural front. With more irrigation and cropping intensities there would be more employment for agricultural labour and in the case of farmers with small holdings they would find more employment on their own farms. Not only would the gross cropped area increase but due to the advent of intensive practices for getting higher yields the same crop would need more attention and consequently the farmers would be more fruitfully employed on their own farms. The increase in employment due to the shift from unirrigated to irrigated agriculture or from traditional varieties of crops to high yielding varieties of crops is difficult to quantify in the absence of a detailed study. However, it is roughly estimated that increased agricultural activities generate about 45 man-days of employment per ha. With an additional area of 4.5 million ha. under field channels the increased employment would be 202.5 million man-days at the end of the 5 year period or 750,000 man years. This would be permanent and recurring feature. This would go a long way in reducing the dependence of the poorer Section of the rural areas on Government's construction work.

BENEFITS TO THE SCHEDULED CASTES/TRIBES

10.8 By its very nature the CAD Programme is an area development programme and all persons falling within the areas developed would automatically benefit from it, either directly through increased agricultural production or through the employment generated. Given the basic objective of the programme, it is difficult to specifically ear-mark either physical areas or funds for the specific benefit of the scheduled castes and tribes in the areas covered by the Programme.

10.9 Our general experience is that the weaker sections if they are the owners of land, generally have very small holdings and these too are located in places which are generally denied the benefits of irrigation and other development activities. Since the area covered at a time is taken up in its entirety all the lands would benefit including those of the weaker section. Where they may not be getting any water delivery, the construction of field channels coupled with warabandi would ensure their due share. If land development works are to be taken up on their farms they would be entitled to subsidy provided their farm sizes are not more than 4 ha. Since very few of the weaker sections have holding beyond this size, the vast majority would benefit from the subsidy. Similarly, they would also be entitled to subsidy for developing ground water either through dug-wells or through shallow tube wells. The latter would enable them to take at least two to three crops a year. The working group feels that the scale of subsidy which has been enhanced to 50% for Scheduled Tribes should be enhanced like-wise for the Scheduled Castes at least up to two ha. holdings.

APPENDIX-I

LIST OF IRRIGATION PROJECTS INCLUDED UNDER THE
CENTRALLY SPONSORED COMMAND AREA DEVELOPMENT
PROGRAMME DURING VTH FIVE YEAR PLAN

Sl. No.	Name of State/ Irrigation Projects	Sl. No.	Name of State/Irrigation Projects
ANDHRA PRADESH		JAMMU & KASHMIR	
1. K.C. Canal 2. Nagarjunasagar 3. Sreerama Sagar (Pochampad) 4. Rajoli Bunda Diversion Scheme 5. Tungabhadra Complex		20. Tawi L.I. Scheme KARNATAKA	
ASSAM		21. Cauveri Basin Project 22. Ghataprabha 23. Malaprabha 24. Tungabhadra 25. Upper Krishna	
6. Jamuna		KERALA	
BIHAR		26. Chala Kudi 27. Malam Puzia 28. Peechi	
7. Gandak 8. Kiul 9. Badua 10. Chandan 11. Kosi 12. Sone		MADHYA PRADESH	
GUJARAT		29. Barna 30. Halali 31. Chambal 32. Hasdeo 33. Kharung 34. Maniyari 35. Tawa	
13. Mahi-Kadana 14. Shetrungi 15. Ukai Kakrapar		MAHARASHTRA	
HARYANA		36. Bagh 37. Itiadoh 38. Bhima 39. Ghod	
16. Gurgaon Canal 17. J.L.Nehru L.I.Scheme 18. Jui L.I. Scheme 19. Rewari L.I. Scheme			

Sl. No.	Name of State/Irrigation Projects	Sl. No.	Name of State/Irrigation Projects
40.	Purna		TAMIL NADU
41.	Jayakwadi Stg.I		
42.	Girna	52.	Cauveri System
43.	Upper Tapi	53.	Lower Bhawani
44.	Krishna	54.	Periyal
	MANIPUR		UTTAR PRADESH
45.	Loktak L.I. Scheme	55.	Gandak
		56.	Ramganga
	ORISSA	57.	Sharda Sahayak
46.	Hirakud		WEST BENGAL
47.	Mahanadi Delta		
48.	Soland	58.	D.V. System
	RAJASTHAN	59.	Kangsabati
49.	Bakra Gang Canal	60.	Mayurkshi
50.	Chambal		
51.	R.C.P. Stage-I		



**LIST OF PROJECTS APPROVED BY THE SANCTIONING
COMMITTEE FOR NEW PROJECTS FOR INCLUSION
UNDER THE CENTRALLY SPONSORED CAD PROGRAMME
AT ITS MEETING HELD ON 7.8.1979**

<u>Sl. No.</u>	<u>State</u>	<u>Name of the Project</u>
1.	Goa	Salauli
2.	Jammu & Kashmir	Ravi
3.	Kerala	Neyyar
4.	Kerala	Pothundy
5.	Kerala	Gayathri
6.	Kerala	Walayar
7.	Kerala	Mangalam
8.	Kerala	Cheerakuzhi
9.	Kerala	Vashani
10.	Maharashtra	Mula
11.	Maharashtra	Xukadi
12.	Maharashtra	Pench
13.	Maharashtra	Upper Penganga
14.	Maharashtra	Warna
15.	Maharashtra	Jayakwadi (Stage II)
16.	Maharashtra	Panzan L.BC



YEARWISE ACHIEVEMENTS OF LAND

State/Project	Ultimate target	During IV Plan	Land	
			1974-75	1975-76
1	2	3	4	5
I. ANDHRA PRADESH				
1. Nagarjunasagar LBC	200.0	-	-	-
2. Nagarjunasagar RBC	240.0	-	-	-
3. Sreeramasagar	135.0	-	20.31	1.05
4. Tungabhadra	63.0	-	-	-
State Total:	<u>638.00</u>	<u>-</u>	<u>20.31</u>	<u>1.05</u>
II. ASSAM				
5. Jamuna Lift Irr. Sch.	-	-	-	-
III. BIHAR				
6. Gandak	6.00	-	-	-
7. R.B.C.	-	-	-	-
8. Kosi	-	-	0.22	0.32
9. Sone	6.00	-	-	-
State Total:	<u>12.00</u>	<u>-</u>	<u>0.22</u>	<u>0.32</u>
IV. GUJARAT				
10. Mahi Kadana	25.00	9.42	3.00	1.30
11. Shetrunji	9.60	0.95	0.48	0.35
12. Ukai Kakrapar	80.00	1.00	3.00	4.00
State Total:	<u>114.60</u>	<u>11.37</u>	<u>6.48</u>	<u>5.65</u>
V. HARYANA				
13. Gurgaon Canal	13.10	-	-	-
14. J.L.N. Lift Irr. Sch.	25.00	-	-	-
15. Jui Lift Irr. Sch.	12.00	-	-	-
16. Rewari Lift Irr. Sch.	3.30	-	-	-
State Total:	<u>53.40</u>	<u>-</u>	<u>-</u>	<u>-</u>

APPENDIX-II

LEVELLING/SHAPING IN CAD PROJECTS

('000 ha.)

Levelling/Shaping		Total dur- ing V Plan	1978-79	1979-80	Total
1976-77	1977-78				
6	7	8	9	10	11

-	1.87	1.87	9.03	4.93	15.83
-	0.26	0.26	4.00	9.46	13.72
4.51	8.61	34.48	4.96	6.49	45.93
-	-	-	0.20	0.39	0.59
4.51	10.74	36.61	18.19	21.27	76.07

-	-	-	-	-	-
0.13	0.01	0.14	0.08	0.04	0.26
-	-	-	-	-	-
0.11	0.05	0.70	-	-	0.70
-	0.02	0.02	1.47	0.03	1.62
0.24	0.08	0.86	1.55	0.07	2.48

निर्माण तथा अन्य

3.49	4.06	11.85	1.69	1.70	24.66
1.10	1.36	3.29	0.06	0.02	4.32
3.42	4.27	14.69	4.34	4.70	24.73
8.01	9.69	29.83	6.09	6.42	53.71

0.22	0.24	0.46	0.40	0.72	1.58
-	0.06	0.06	0.65	0.32	1.03
0.44	0.14	0.58	0.24	0.18	1.00
0.05	0.16	0.21	0.95	0.58	1.74
0.71	0.60	1.31	2.24	1.80	5.35

	1	2	3	4	5
VI. JAMMU & KASHMIR					
17. Ravi Tawi Project	11.00	-	0.96	0.16	
VII. KARNATAKA					
18. Krishnaraja Sagar	76.80	76.80	-	-	
19. Ghataprabha	249.00	39.90	-	5.31	
20. Malaprabha	182.00	0.29	3.56	2.67	
21. Tungabhadra	262.00	179.80	19.50	20.10	
22. Upper Krishna	319.00	-	-	-	
State Total:	1088.80	296.79	23.06	28.08	
VIII. MADHYA PRADESH					
23. Barna	5.00	-	-	-	
24. Halali	3.00	-	-	-	
25. Chambal	5.00	-	-	0.13	
26. Hasdeo	5.00	-	-	-	
27. Kharung	5.00	-	-	-	
28. Maniyari	5.00	-	-	-	
29. Tawa	150.00	0.70	1.70	2.71	
State Total:	178.00	0.70	1.70	2.84	
IX. MAHARASHTRA					
30. Bagh	24.40	1.27	2.89	2.95	
31. Itiadoh	26.20	2.84	2.95	2.24	
32. Pench	62.00	-	-	-	
33. Bhima	126.00	-	-	-	
34. Ghod	24.60	10.43	3.56	1.61	
35. Purna	61.50	23.51	16.81	5.66	
36. Jayakwadi	277.20	5.50	13.19	11.86	
37. Girna	57.20	36.18	11.07	4.07	
38. Upper Tapi	37.70	-	-	-	
39. Panjan	12.10	-	-	-	
40. Kukadi	132.00	-	-	-	

<u>1</u>	<u>6</u>	<u>1</u>	<u>7</u>	<u>1</u>	<u>8</u>	<u>1</u>	<u>9</u>	<u>1</u>	<u>10</u>	<u>1</u>	<u>11</u>
----------	----------	----------	----------	----------	----------	----------	----------	----------	-----------	----------	-----------

0.41	0.51	2.04	0.91	2.07	5.02						
-	-	-	-	-	-	76.80					
18.89	11.40	35.60	2.30	0.17	77.97						
4.08	4.50	14.81	4.00	0.60	19.70						
10.25	9.77	59.62	8.42	8.72	256.56						
-	-	-	-	-	-	-					
33.22	25.67	11.03	14.72	9.49	431.03						

-	-	-	-	0.20	0.20						
-	-	-	-	0.20	0.20						
0.77	0.50	1.40	0.65	0.65	2.70						
-	-	-	-	0.10	0.10						
-	-	-	-	0.10	0.10						
-	-	-	-	0.10	0.10						
1.77	0.98	7.16	3.22	3.20	14.38						
2.54	1.48	8.56	3.87	4.65	17.78						



नवरात्रि उत्सव

2.73	3.85	12.42	1.21	1.06	15.96						
1.80	0.93	7.92	0.72	0.94	12.42						
-	-	-	-	3.71	3.71						
1.77	1.65	3.42	2.63	4.49	10.54						
1.89	0.98	8.04	0.46	0.29	19.22						
2.13	1.54	26.14	0.49	0.13	50.27						
10.89	14.73	50.67	16.72	12.02	84.91						
1.85	0.55	17.54	0.96	0.84	55.52						
0.33	0.41	0.74	0.34	0.37	1.45						
-	-	-	-	-	-						
-	-	-	-	1.38	1.38						

	1	2	3	4	5
41. Mula		97.90	-	-	
42. Krishna		74.00	-	-	-
State Total:		1012.80	79.73	50.47	28.39

X. ORISSA

43. Hirakud	-	-	-	-
44. Mahanadi Delta	-	-	-	-
45. Puri Delta	-	-	-	-
46. Solanadi	-	-	-	-
State Total:	-	-	-	-

XI. RAJASTHAN

47. Chambal	229.00	-	-	-
48. R.C.P.	54.00	-	2.00	0.95
State Total:	283.00	-	2.00	0.95

XII. TAMIL NADU

49. Cauveri Irr. System	-	-	-	-
50. Lower Bhawani	-	-	-	-
51. Periyar Vagai	-	-	-	-
State Total:	-	-	-	-

XIII. UTTAR PRADESH

52. Gandak	-	-	0.09	0.11
53. Ramganga	-	-	-	-
54. Sharda Shahayak	-	-	-	-
State Total:	-	-	0.09	0.11

XIV. WEST BENGAL

55. D.V. Canal System	-	-	-	-
56. Kangsabati	8.00	1.77	0.34	0.15
57. Mayurakshi	-	-	-	-
State Total:	8.00	1.77	0.34	0.15
Grand Total:	3399.60	390.36	105.63	67.70

6	7	8	9	10	11
-	-	-	-	44.53	44.53
0.16	2.10	2.26	2.15	4.04	8.45
23.55	26.74	129.15	25.68	73.80	308.36
-	-	-	-	-	-
-	0.09	0.09	-	0.58	0.67
-	-	-	-	-	-
-	-	-	-	0.06	0.06
-	0.09	0.09	-	0.64	0.73
0.16	5.33	5.49	3.87	2.43	11.79
1.32	2.94	7.21	3.50	5.36	16.07
1.48	8.27	12.70	7.37	7.79	27.86
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
0.32	0.02	0.54	0.04	-	0.58
3.01	2.26	5.27	0.22	0.08	5.57
-	-	-	-	-	-
3.33	2.28	5.81	0.26	0.08	6.15
-	-	-	0.07	-	0.07
-	-	0.49	0.10	-	2.36
-	-	-	-	-	-
-	-	0.49	0.17	-	2.43
78.00	86.15	337.48	81.05	128.08	936.97





	1	2	3	4
VI. RAJASTHAN				
15. Chambal	-	1.64	0.65	
16. R.C.P.	0.38	20.69	217.22	
State Total:	<u>0.38</u>	<u>22.33</u>	<u>217.87</u>	
VII. UTTAR PRADESH				
17. Ramganga	-	-	-	
18. Sharda Sahayak	-	-	-	
State Total:	<u>-</u>	<u>-</u>	<u>-</u>	
Grand Total:	85.28	127.29	349.50	



5	6	7	8	9	10
15.18	17.47	9.15	41.93	51.08	68.55
117.66	355.95	209.49	158.16	367.65	723.60 (Mar. 80)
132.84	373.42	218.64	200.09	418.73	792.15
0.14	0.14	4.82	-	4.82	4.96
-	-	101.27	-	101.27	101.27
0.14	0.14	106.09	-	106.09	106.23 (Dec. 79)
260.98	823.05	547.99	696.11	1244.10	2067.23



YEAR-WISE RELEASES OF CENTRAL

Sl. No.	Name of the State	1974-75	1975-76	1976-77
1	2	3	4	5
1.	Andhra Pradesh	46.28	95.93	173.78
2.	Assam	-	-	10.00
3.	Bihar	157.76	194.35	337.99
4.	Gujarat	224.69	244.70	217.60
5.	Haryana	6.45	33.18	19.00
6.	Jammu & Kashmir	0.50	3.78	5.19
7.	Karnataka	10.50	103.21	126.60
8.	Kerala	0.56	0.49	4.00
9.	Madhya Pradesh	165.75	112.40	153.87
10.	Maharashtra	105.84	216.35	156.17
11.	Manipur	-	-	1.00
12.	Orissa	30.60	22.99	12.90
13.	Rajasthan	168.39	279.49	233.54
14.	Tamil Nadu	-	-	1.50
15.	Uttar Pradesh	67.68	236.26	393.61
16.	West Bengal	15.00	56.87	39.55
Grand Total:		1,000.00 *(804.20)	1,600.00 (360.61)*	1,886.30

* For spill over works from IVth Plan.

APPENDIX-IV A

ASSISTANCE TO THE STATES 1974-75 to 1979-80

(Rs. in lakhs)

1977-78 I	V Plan Total 1974-78 II	1978-79 III	1979-80 IV	Total 1978-80 II	Grand Total 1974-80 (I + II)	
					6	7
227.24	543.23	253.37	136.26	389.63		932.86
-	10.00	5.49	6.03	11.52		21.52
222.56	912.66	587.70	167.25	754.95		1,667.61
253.64	940.63	174.61	200.77	375.38		1,316.01
5.58	64.21	6.00	10.68	16.68		80.89
9.61	19.08	-	19.79	19.79		38.87
212.57	452.88	122.47	332.67	455.14		908.02
0.94	5.99	40.90	49.36	90.26		96.25
163.00	595.02	36.13	114.00	150.13		745.15
183.55	661.91	85.15	277.24	362.39		1,024.30
-	1.00	-	-	-		1.00
17.25	83.74	44.64	37.80	82.44		166.18
148.98	830.40	576.20	415.20	991.40		1,821.80
-	1.50	-	-	-		1.50
681.08	378.63	894.45	696.40	1,590.85		2,969.48
33.00	144.42	84.38	22.00	106.38		250.80
2,159.00	6,645.30	2,911.49	2,485.45	5,396.94		12,042.24

STATESWISE ALLOCATION UNDER

Sl. No.	State	State Sector			Total 1974-80
		Vth Plan 1974-78	1978-80	4	
1	2	3	4	5	
1.	Andhra Pradesh	850.00	1109.00		1959.00
2.	Assam	47.00	36.00		83.00
3.	Bihar	562.00	193.00		755.00
4.	Gujarat	250.00	105.00		355.00
5.	Haryana	161.00	464.00		625.00
6.	Jammu & Kashmir	26.00	169.00		195.00
7.	Karnataka	606.00	536.00		1142.00
8.	Kerala	12.00	22.00		34.00
9.	Madhya Pradesh	693.00	789.00		1482.00
10.	Maharashtra	147.00	816.00		963.00
11.	Manipur	10.00	-		10.00
12.	Orissa	215.00	655.00		870.00
13.	Rajasthan	639.00	889.00		1528.00
14.	Tamil Nadu	52.00	77.00		129.00
15.	Tripura	-	0.80		0.80
16.	Uttar Pradesh	566.00	1387.00		1953.00
17.	West Bengal	768.00	328.00		1096.00
Total:		5604.00	7575.80		13179.80

APPENDIX-IV B

COMMAND AREA DEVELOPMENT PROGRAMME

(Rs. in Lakhs)

Central Sector Releases			Institutional Sector		
Vth Plan 1974-78	1978-80	Total 1974-80	Vth Plan 1974-78	1978-80	Total 1974-80
6	7	8	9	10	11
543.23	389.63	932.86	78.47	410.76	489.23
10.00	11.52	21.52	-	-	-
912.66	754.95	1667.61	-	-	-
940.63	375.38	1316.01	194.40	-	194.40
64.21	16.68	80.89	-	-	-
19.08	19.79	38.87	-	-	-
452.88	455.14	908.02	150.11	33.86	183.97
5.99	90.26	96.25	-	-	-
595.02	150.13	745.15	26.51	128.35	154.86
661.91	362.39	1024.30	-	146.31	146.31
1.00	-	1.00	-	-	-
83.74	82.44	166.18	-	-	-
830.40	991.40	1821.80	373.42	418.73	792.15
1.50	-	1.50	-	-	-
-	-	-	-	-	-
1378.63	1590.85	2969.48	0.14	106.09	106.23
144.42	106.38	250.80	-	-	-
6645.30	5396.94	12042.24	823.05	1244.10	2067.15

RELEASE OF CENTRAL ASSISTANCE DURING THE YEAR

Sl. No.	Name of State	GRANT			
		C.A.D. Authorities Ett.	Topographic and soil Survey	Subsidy	Crop Compen- sation
1	2	3	4	5	6
1.	Andhra Pradesh	-	50.00	68.37	-
2.	Assam	3.60	1.89	-	-
3.	Bihar	7.44	68.78	350.00	-
4.	Gujarat	6.11	103.50	-	-
5.	Haryana	-	5.37	0.63	-
6.	Jammu & Kashmir	-	-	-	-
7.	Karnataka	9.89	10.00	3.00	-
8.	Kerala	4.87	2.03	-	-
9.	Madhya Pradesh	-	36.13	-	-
10.	Maharashtra	10.73	31.64	1.43	-
11.	Manipur	-	-	-	-
12.	Orissa	7.11	31.53	6.00	-
13.	Rajasthan	96.70	82.50	-	12.00
14.	Tamil Nadu	-	-	-	-
15.	Uttar Pradesh	17.15	183.55	200.00	-
16.	West Bengal	2.80	15.00	66.58	-
17.	Adm. Staff College of India, Hyderabad	-	-	-	*3.177
Total:		166.40	621.92	696.01	12.00
					*+3.177

* Consultancy fee.

APPENDIX-V

1978-79 FOR COMMAND AREA DEVELOPMENT PROGRAMME

(Rs. in Lakhs)

Total	LOAN			S.L.A.	Equity	Grand Total
	Field Channels	Purchase of equipment	Total			
7	8	9	10	11	12	13
118.37	100.00	35.00	135.00	-	-	253.37
5.49	-	-	-	-	-	5.49
426.22	50.00	-	50.00	6.48	105.00	587.70
109.61	50.00	-	50.00	15.00	-	174.61
6.00	-	-	-	-	-	6.00
-	-	-	-	-	-	-
22.89	88.92	10.66	99.58	-	-	122.47
6.90	-	-	-	-	34.00	40.90
36.13	-	-	-	-	-	36.13
43.80	41.35	-	41.35	-	-	85.15
-	-	-	-	-	-	-
44.64	-	-	-	-	-	44.64
191.20	250.00	-	250.00	70.00	65.00	576.20
-	-	-	-	-	-	-
400.70	493.75	-	493.75	-	-	894.45
84.38	-	-	-	-	-	84.38
-	-	-	-	-	-	3.177
1496.33	1074.02	45.66	1119.68	91.48	204.00	2914.667

*Consultancy fee.

RELEASE OF CENTRAL ASSISTANCE TO THE STATES DURING 1979-80 FOR

Sl. No.	State	GRANTS						
		C.A.D. Nett.	Soil etc. Surveys	War- bandi Surveys	Subsidy to Small & Marginal farmers	Crop- Com- pen- sa- tion	Field Cham- pels	
1	2	3	4	5	6	7	8	
1.	Andhra Pradesh	29.10	77.91	-	4.25	-	25.00	
2.	Assam	5.88	0.15	-	-	-	-	
3.	Bihar	14.00	70.00	-	60.00	-	-	
4.	Goa	-	-	-	-	-	-	
5.	Gujarat	2.69	91.06	0.40	21.40	-	40.00	
6.	Haryana	-	10.68	-	-	-	-	
7.	Jammu & Kashmir	3.20	0.50	-	3.09	-	-	
8.	Karnataka	34.94	89.95	-	9.05	-	45.00	
9.	Kerala	6.73	5.36	-	22.27	-	-	
10.	Madhya Pradesh	12.00	57.00	-	-	-	5.00	
11.	Maharashtra	15.53	114.71	-	19.06	-	40.23	
12.	Manipur	-	-	-	-	-	-	
13.	Orissa	2.50	23.30	-	-	-	8.50	
14.	Rajasthan	82.46	71.74	-	-	18.00	79.00	
15.	Tamil Nadu	-	-	-	-	-	-	
16.	Uttar Pradesh	27.27	187.50	7.50	100.00	-	150.00	
17.	West Bengal	3.67	8.94	-	1.21	-	3.18	
	Total:	239.97	808.80	7.90	240.35	18.00	395.91	
	Direct expendi- ture by the Centre							

APPENDIX-VI

THE CENTRALLY SPONSORED COMMAND AREA DEVELOPMENT PROGRAMME

(Rs. in Lakhs)

		LOANS							
		Total	Field Chan- nels	Pur- chase of equip- ment	Equity Contri- bution by State	Total	S.L.A.	Grand Total	
		9	10	11	12	13	14	15	16
Adaptive trials	-	136.26	-	-	-	-	-	-	136.26
Training	-	6.03	-	-	-	-	-	-	6.03
Demonstration	-	144.00	-	-	23.25	23.25	-	-	167.25
etc.	-	-	-	-	-	-	-	-	-
0.15	155.70	45.07	-	-	-	45.07	-	-	200.77
-	10.68	-	-	-	-	-	-	-	10.68
-	6.79	-	5.00	8.00	13.00	-	-	-	19.79
-	178.94	64.48	89.25	-	153.73	-	-	-	332.67
-	34.36	-	-	15.00	15.00	-	-	-	49.36
-	74.00	-	-	40.00	40.00	-	-	-	114.00
-	189.55	87.69	87.69	-	-	87.69	-	-	277.24
-	-	-	-	-	-	-	-	-	-
-	34.30	3.50	-	-	3.50	-	-	-	37.80
-	251.20	79.00	-	85.00	164.00	-	-	-	415.20
-	-	-	-	-	-	-	-	-	-
1.13	473.40	173.00	-	50.00	223.00	-	-	-	696.40
5.00	22.00	-	-	-	-	-	-	-	22.00
6.28	1717.21	452.74	94.25	221.25	768.24	-	-	-	2485.45
									0.74
Grand Total:									2486.19

STATEMENT SHOWING CREATION AND UTILISATION
1973-74 AND 1979-80 - TOTAL INCREASE
UTILISATION IN

Sl. No.	Name of the CAD Project	1973-74			Potential likely to be created
		Potential created	Potential utilised	% Utili- sation	
1	2	3	4	5	6
I. ANDHRA PRADESH					
1.	Nagarjunasagar	414.00	316.00	76.33	616.00
2.	Sreerama Sagar	47.00	29.00	61.70	125.00
3.	Gajulatinne	-	-	-	2.02
4.	K.C. Canal	122.21	115.00	94.10	122.21
5.	Rajoli Bund Diversion Scheme	35.42	24.95	70.44	35.42
6.	Tungbhadrā	113.58	83.40	73.43	120.62
II. ASSAM					
7.	Jamuna	33.00	12.00	27.50	25.80
III. BIHAR					
8.	Gandak	380.00	110.00	28.95	696.00
9.	Badua	42.50	38.00	89.41	42.51
10.	Chandan	40.80	27.30	66.91	62.75
11.	Kiul	25.92	25.92	100.00	25.92
12.	Kosi	275.00	152.00	55.27	341.00
13.	Sone	196.90	180.30	91.57	578.00
IV. GOA					
14.	Salauli Irr. Project	-	-	-	-
V. GUJARAT					
15.	Mahi Kadana	132.00	66.70	50.53	271.09
16.	Shetrunji	42.53	27.67	65.07	42.53
17.	Ukai Kakrapar	225.20	114.10	50.64	380.41

APPENDIX-VII

OF IRRIGATION POTENTIAL AT THE END OF
AND INCREASE DUE TO CAD PROGRAMME IN
IRRIGATION PROJECTS

('000 ha.)

1979-80	Increase due to CAD Programme						Anticipated Potential to be created by the end of March '80/1984-85
	Potential likely to be utilised	% Utilisation	Increase in utilisation	Increase in %	Area	Area covered under field channel	
7	8	9	10	11	12	13	
328.08	53.26	12.08	-	-	53.42	753.00	
40.00	32.00	11.00	-	-	93.81	250.00	
0.95	47.03	0.95	47.03	0.95	-	13.00	
122.21	100.00	7.21	4.90	7.21	-	122.21	
35.42	100.00	10.47	29.56	10.47	-	35.42	
115.62	95.85	32.22	22.42	27.04	2.57	155.62	
20.00	77.52	8.00	50.02	12.91	2.90	25.80	
363.00	52.16	253.00	23.21	161.54	38.72	996.00	
41.60	97.88	3.60	8.47	3.60	6.90	42.51	
59.00	94.02	31.70	27.11	17.01	-	62.75	
25.92	100.00	-	-	-	-	25.92	
173.00	50.73	21.00	-	-	8.73	390.00	
537.00	92.91	356.70	1.34	7.75	13.07	583.00	
-	-	-	-	-	-	14.50	
105.00	38.73	38.30	-	-	133.73	351.00	
27.67	65.06	-	-	-	21.55	42.53	
166.00	43.60	51.90	-	-	211.69	380.91	

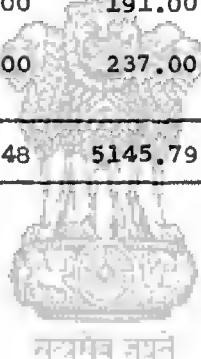
1	2	3	4	5	6
VI. HARYANA					
18.	Gurgaon Canal	34.00	10.00	29.51	60.00 -
19.	J.L.N. Lift Scheme	4.00	1.00	25.00	45.00 -
20.	Jui Lift Irr. Sch.	16.00	5.00	31.25	19.00
21.	Rewari Lift Irr.Sch.	20.00	10.00	50.00	20.00
VII. JAMMU & KASHMIR					
22.	Ravi Canal	-	-	-	-
23.	Tawi Lift Irr.Sch.	1.50	00.70	46.67	12.88
VIII. KARNATAKA					
24.	Krishnaraja Sagar	50.59	50.59	100.00	50.59
25.	Ghataprabha	75.50	64.00	84.77	147.30
26.	Malaprabha	26.00	9.60	36.92	120.59
27.	Tungbhadra	314.00	215.50	68.63	336.89
28.	Upper Krishna	-	-	-	-
IX. KERALA					
29.	Chalakudi	39.38	39.38	100.00	39.38
30.	Cheerakuzhi	-	-	-	2.83
31.	Gayathri	-	-	-	10.93
32.	Malampuzha	42.09	42.09	100.00	42.09
33.	Mangalam	-	-	-	6.80
34.	Neyyar	-	-	-	17.95
35.	Peechi	23.17	23.17	100.00	23.17
36.	Pothundi	-	-	-	10.93
37.	Vazhani	-	-	-	7.13
38.	Walayar	-	-	-	6.47
X. MADHYA PRADESH					
39.	Barna	-	-	-	60.70
40.	Halali	-	-	-	8.00
41.	Chambal	273.00	143.00	52.38	273.00
42.	Hasdeo	-	-	-	42.00
43.	Kharung	40.47	40.47	100.00	40.47

7	8	9	10	'11	12	13
17.00	28.33	7.00	-	-	-	70.00
9.00	20.00	8.00	-	-	-	85.00
12.00	63.16	7.00	31.91	6.06	0.26	19.00
10.00	50.00	-	-	-	-	21.00
-	-	-	-	-	-	15.00
6.00	46.88	5.30	0.21	0.03	14.00	12.88
50.59	100.00	-	-	-	76.80	79.90
147.30	100.00	83.30	15.23	22.43	145.42	217.30
107.15	88.85	97.55	51.93	62.62	96.75	160.59
324.97	96.46	109.47	27.83	93.76	339.04	341.89
-	-	-	-	-	0.72	-
39.38	100.00	-	-	-	-	39.38
1.75	61.84	1.75	61.84	0.15	-	2.83
10.11	92.50	10.11	92.50	1.11	-	10.93
42.09	100.00	-	-	-	-	42.09
6.61	96.08	6.61	96.08	6.61	-	6.88
16.18	90.14	16.18	90.14	16.18	-	17.95
23.17	100.00	-	-	-	-	23.17
10.05	91.95	10.05	91.95	10.05	-	10.93
4.23	59.33	4.23	59.33	4.23	-	7.13
6.47	100.00	6.47	100.00	6.47	-	6.47
25.00	41.19	25.00	41.19	25.00	27.00	60.70
6.10	76.25	6.10	76.25	6.10	4.50	37.00
162.00	59.34	19.00	6.96	19.00	18.42	273.00
42.00	100.00	42.00	100.00	42.00	11.00	42.00
40.47	100.00	-	-	-	0.50	48.58

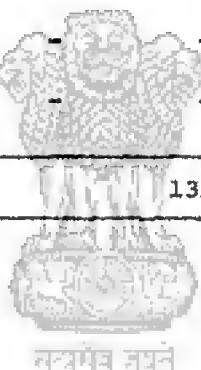
1	2	3	4	5	6
44.	Maniyari	30.76	30.76	100.00	30.76
45.	Tawa	-	-	-	120.00
XI. MAHARASHTRA					
46.	Bagh	19.30	6.00	31.09	33.67
47.	Itiadoh	27.70	16.50	59.97	40.08
48.	Pench	-	-	-	24.77
49.	Bhima	5.30	-	-	27.75
50.	Ghod	24.60	10.60	43.09	24.96
51.	Purna	61.50	20.60	33.50	57.99
52.	Jayakwadi I & II	24.10	-	-	111.48
53.	Upper Penganga	-	-	-	-
54.	Girna	57.20	26.20	45.80	59.00
55.	Upper Tapi	-	-	-	4.78
56.	Punjan	-	-	-	-
57.	Kukadi	-	-	-	20.00
58.	Mula	-	-	-	78.56
59.	Krishna	-	-	-	41.58
60.	Warna	-	-	-	-
XII. MANIPUR					
61.	Loktak Lift Irr.Sch.	-	नवापान संस्था	-	3.00
XIII. ORISSA					
62.	Hirakud	250.64	250.57	99.97	251.15
63.	Mahanadi Delta	327.70	327.70	100.00	533.75
64.	Salandi	52.70	46.70	88.61	59.14
XIV. RAJASTHAN					
65.	Chambal	174.00	157.00	90.23	213.00
66.	(a) Bhakra	238.00	238.00	100.00	238.00
	(b) Gang Canal	303.52	303.52	100.00	303.52
67.	Rajasthan Canal Project Stage I	290.00	222.00	76.55	527.00

1	7	8	9	10	11	12	13
	30.76	100.00	-	-	-	0.50	50.20
	38.00	31.67	38.00	31.67	38.00	58.11	320.00
	17.00	50.49	11.00	19.40	6.53	16.03	34.00
	22.00	54.89	5.50	-	-	11.63	40.00
	3.00	12.11	3.00	12.11	3.00	3.91	49.00
	6.50	23.42	6.50	23.42	5.60	12.47	99.00
	23.23	93.07	12.63	49.98	12.48	19.44	24.98
	36.45	62.86	15.85	29.36	17.03	50.08	57.30
	42.00	37.67	42.00	37.67	42.00	83.25	208.00
	-	-	-	-	-	-	-
	34.50	58.47	8.30	12.67	7.48	57.04	59.00
	-	-	-	-	-	0.42	55.00
	-	-	-	-	-	0.60	2.50
	3.00	15.00	3.00	15.00	3.00	4.59	74.00
	45.00	57.28	45.00	57.28	45.00	64.92	86.00
	5.00	12.02	5.00	12.02	5.00	18.28	92.00
	-	-	-	-	-	-	-
	3.00	100.00	3.00	100.00	3.00	-	40.00
	251.15	100.00	0.58	0.03	0.08	-	251.15
	533.75	100.00	206.05	-	-	5.65	562.00
	59.14	100.00	12.44	11.39	6.74	0.38	60.00
	210.00	98.59	53.00	8.36	17.81	149.31	219.00
	238.00	100.00	-	-	-	-	414.80
	303.52	100.00	-	-	-	-	
	331.00	62.81	109.00	-	-	112.60	590.00

1	2	3	4	5	6
XV. TAMIL NADU					
68.	Cauveri System	428.98	428.98	100.00	428.98
69.	Lower Bhawani	78.92	78.92	100.00	78.92
70.	Periyar Vagai	62.32	62.32	100.00	62.32
XVI. UTTAR PRADESH					
71.	Gandak	216.51	102.17	47.19	318.37
72.	Ramganga	167.97	121.41	71.43	591.00
73.	Sarda Sahayak	-	-	-	1069.00
XVII. WEST BENGAL					
74.	D.V.C. System	331.00	291.00	87.91	450.00
75.	Kangsabati	206.00	191.00	92.71	385.00
76.	Mayurakshi	237.00	237.00	100.00	250.86
<hr/>					
Total:		6701.48	5145.79	76.28	11330.85



7	1	8	1	9	1	10	1	11	1	12	1	13
428.98		100.00		-		-		-		23.00		522.00
78.92		100.00		-		-		-		-		83.97
62.32		100.00		-		-		-		-		85.32
250.50		78.68		148.33		31.87		100.19		207.44		332.00
394.50		66.74		273.09		-		-		365.72		591.00
423.00		39.57		423.00		39.57		423.00		457.66		1582.00
400.00		88.88		100.00		0.97		4.37		0.30		515.00
300.00		77.92		109.00		-		-		2.37		401.00
245.00		97.66		8.00		-		-		0.73		251.00
8099.31		71.48		2953.52				1311.19		3080.93		13646.91



सत्यमेव जयते

PROJECT-WISE TARGETS FOR FIELD CHANNELS AND LAND LAVELLING

Sl. No.	Name of the State/ Project	C.C.A. (as on 1.4.80)	Balancel	FIELD		CHAN-	
			80-81	81-82	82-83	83-84	
1	2	3	4	5	6	7	8

I. ANDHRA PRADESH

1. (a) Nagarjunasagar L.B.C.	392.0	364.31	10.0	11.0	12.0	14.0
(b) Nagarjunasagar R.B.C.	475.0	449.27	10.0	12.0	15.0	17.0
2. Sriramsagar	267.0	173.19	35.0	35.0	35.0	35.0
3. Gajuladinne	13.6	13.60	-	2.0	3.0	4.0
4. K.C. Canal	122.2	122.20	-	-	-	-
5. Rajoli Bunda Div. Sch.	33.2	33.20	-	-	-	-
6. Tungabhadra	160.3	157.73	5.0	5.0	5.0	5.0

State Total: 1463.3 1313.50 60.0 65.0 70.0 75.0

II. ASSAM

7. Jamuna Lift Irr. Sch.	25.4	22.50	1.0	2.0	2.0	2.0
--------------------------	------	-------	-----	-----	-----	-----

III. BIHAR

8. Eastern Gandak	960.0	921.28	35.0	40.0	45.0	50.0
9. Badua	42.44					
10. Chandan	63.94	121.74	10.0	15.0	20.0	25.0
11. Kiul	22.26					
12. Kosi	440.00	431.28	15.0	20.0	25.0	30.0
13. Sone	865.0	851.93	20.0	25.0	30.0	35.0

State Total: 2393.64 2326.23 80.0 100.0 120.0 140.0

IV. GOA

14. Salauli Irr. Project	14.4	14.40	-	2.0	3.0	4.0
--------------------------	------	-------	---	-----	-----	-----

APPENDIX-VIII

UNDER CAD DURING VI FIVE YEAR PLAN (1980-81 TO 1984-85)

('000 ha.)

NAL'S		Balance	LAND LEVELLING					
84-85	Total	(as on 1.4.80)	80-81	81-82	82-83	83-84	84-85	Total
of field chan- nels to be done								
9	10	11	12	13	14	15	16	17
16.0	63.0	184.17	10.0	12.0	16.0	17.0	20.0	75.0
20.0	74.0	226.28	5.0	7.0	10.0	10.0	10.0	42.0
135.0	175.0	89.07	7.0	10.0	10.0	10.0	10.0	47.0
4.0	13.0	13.00	-	2.0	3.0	4.0	4.0	13.0
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
5.0	25.0	49.41	2.0	2.0	2.0	2.0	2.0	10.0
80.0	350.0	561.93	24.0	33.0	41.0	43.0	46.0	187.0
3.0	10.0	-	-	-	-	-	-	-
25.0	225.0	5.74	0.5	1.0	1.0	1.0	2.0	5.5
30.0	100.0	-	-	-	-	-	-	-
35.0	125.0	-	-	-	-	-	-	-
40.0	150.0	4.48	0.5	1.0	1.0	1.0	1.0	4.5
160.0	600.0	10.22	1.0	2.0	2.0	2.0	3.0	10.0
5.0	14.0	14.40	-	2.0	2.0	3.0	3.0	10.0

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

V. GUJARAT

15. Mahi-Kadana	200.4	66.67	9.0	10.0	10.0	10.0
16. Shetrunji	29.7	8.15	2.0	2.0	2.0	2.0
17. Ukai Kakarpar	348.0	136.31	9.0	18.0	23.0	23.0
State Total:	578.1	211.13	20.0	30.0	35.0	35.0

VI. HARYANA

18. Gurgaon Canal	131.0	131.00	1.0	1.0	1.0	1.0
19. J.L.N. Lift. Irr. Sch.	250.0	250.00	1.0	1.0	1.0	1.0
20. Jin Lift Irr. Sch.	30.0	29.74	2.0	2.0	2.0	2.0
21. Rewari Lift Irr. Sch.	32.87	32.86	1.0	1.0	1.0	1.0
State Total:	443.87	443.60	5.0	5.0	5.0	5.0

VII. JAMMU & KASHMIR

22. Ravi Canal	31.80	30.68	2.0	3.0	4.0	5.0
23. Tawi Canal	12.88		2.0	1.0	-	-
State Total:	44.68	30.68	4.0	4.0	4.0	5.0

VIII. KARNATAKA

24. Krishnarajasagar	89.03	12.23	-	-	-	-
25. Ghataprabha	317.38	171.96	10	12	13	14
26. Malaprabha	206.05	109.30	10	10	12	13
27. Tungabhadra	342.27	3.23	1	2	-	-
28. Upper Krishna	408.05	407.33	9	11	15	28
State Total:	1362.78	704.05	30	35	40	55

IX. KERALA

29. Chalakudy	27.68	27.68	1.0	1.5	2.5	3.0
30. Cheerukuzhi	2.68	2.68	-	-	-	-
31. Gayathri	7.65	7.65	-	-	-	-
32. Malampuzha	29.46	29.46	1.0	1.5	2.5	3.0
33. Mangalam	4.82	4.82	-	-	-	-
34. Nayyar	16.04	16.04	-	-	-	-

9	10	11	12	13	14	15	16	17
---	----	----	----	----	----	----	----	----

15.0	54.0	0.34	-	-	-	-	-	-
-	8.0	5.28	1.0	1.0	1.0	1.0	1.0	5.0
25.0	98.0	55.24	5.0	10.0	10.0	12.0	12.0	49.0
40.0	160.0	60.89	6.0	11.0	11.0	13.0	13.0	54.0

1.0	5.0	11.52	0.7	0.9	2.0	3.5	4.0	11.1
1.0	5.0	23.97	0.3	0.5	1.5	2.0	2.0	6.3
2.0	10.0	11.00	0.4	0.6	1.5	1.5	2.0	6.0
1.0	5.0	1.56	0.6	1.0	-	-	-	1.6
5.0	25.0	48.05	2.0	3.0	5.0	7.0	8.0	25.0

5.0	19.0	5.98	2.0	2.0	2.0	-	-	6.0
-	3.0	-	-	-	-	-	-	-
5.0	22.0	5.98	2.0	2.0	2.0	-	-	6.0

-	-	-	-	-	-	-	-	-
16	65	171.03	10	12	13	14	16	65
15	60	162.30	10	10	12	13	15	60
-	3	5.44	1	1	1	3	-	6
34	97	319.00	9	12	14	25	34	97
65	225	657.77	30	35	40	55	65	225

3.5	11.5	2.80	0.5	0.5	0.5	-	-	1.5
-	-	2.70	-	-	-	-	-	-
-	-	7.70	-	-	-	-	-	-
3.5	11.5	2.90	0.9	0.9	1.0	-	-	2.8
-	-	0.50	-	-	-	-	-	-
-	-	1.60	-	-	-	-	-	-

1	2	3	4	5	6	7	8
35.	Peechi	25.50	25.50	1.0	1.0	1.0	2.0
36.	Pothundy	8.79	8.79	-	-	-	-
37.	Vazhani	7.67	7.67	-	-	-	-
38.	Walayar	4.54	4.54	-	-	-	-
State Total:		134.83	134.83	3.0	4.0	6.0	8.0

X. MADHYA PRADESH

39.	Barna	55.0	28.00	2.0	3.0	3.0	3.5
40.	Halali	27.93	23.43	2.0	3.0	3.0	3.5
41.	Chambal	326.0	127.58	12.0	12.0	19.0	22.0
42.	Hasdeo R.B.C.	57.0	56.00	2.0	3.0	3.0	3.0
43.	Khaung	47.77	47.27	2.0	3.5	3.5	2.0
44.	Maniyari	55.06	54.56	2.0	3.5	3.5	2.0
45.	Tawa	236.70	178.59	8.0	12.0	15.0	24.0
State Total:		805.46	515.43	30.0	40.0	50.0	60.0

XI. MAHARASHTRA

46.	Bagh	24.40	8.37	2.0	0.9	-	-
47.	Itiodoh	26.20	14.57	2.0	2.0	2.0	2.0
48.	Pench	62.0	58.09	2.5	6.0	6.5	10.0
49.	Bhima (U & P)	126.0	113.53	5.0	6.0	6.5	10.0
50.	Ghod	24.6	5.16	-	-	-	-
51.	Purna	61.50	11.42	-	-	-	-
52.	Jayakwadi (I & II)	277.20	193.95	35.0	30.0	30.0	30.0
53.	Upper Penganga	104.0	104.00	-	-	5.0	10.0
54.	Girna	57.20	-	-	-	-	-
55.	Upper Tapi	37.70	37.28	2.5	5.0	7.5	10.0
56.	Pazzan	12.10	11.50	3.5	3.5	3.5	-
57.	Kukdi	132.0	127.41	5.0	5.0	7.0	10.0
58.	Mula	97.90	32.98	2.5	1.6	-	-
59.	Krishna	74.0	55.72	10.0	12.0	12.0	12.0
60.	Warna	87.0	87.0	-	-	-	2.0
State Total:		1203.80	861.44	70.0	72.0	80.0	96.0

9	10	11	12	13	14	15	16	17
3.0	8.0	2.60	0.6	0.6	0.5	-	-	1.7
-	-	0.90	-	-	-	-	-	-
-	-	0.80	-	-	-	-	-	-
-	-	0.50	-	-	-	-	-	-
10.0	31.0	23.00	2.0	2.0	2.0	-	-	6.0

3.5	15.0	4.80	-	1.0	1.0	1.0	1.6	4.6
3.5	15.0	2.80	-	-	0.5	0.5	1.0	2.0
26.0	91.0	2.30	1.0	-	-	-	-	1.0
2.0	13.0	4.90	-	1.0	1.0	1.0	1.0	4.0
2.0	13.0	4.90	-	1.0	1.0	1.0	1.0	4.0
2.0	13.0	4.90	-	1.0	1.0	1.0	1.0	4.0
34.0	90.0	135.62	4.0	6.0	10.5	15.5	14.4	50.0
70.0	250.0	160.22	5.0	10.0	15.0	20.0	20.0	70.0

-	2.9	8.44	1.5	1.4	1.0	-	-	3.9
1.0	9.0	13.78	1.5	1.6	2.0	2.0	2.0	9.1
10.0	35.0	58.29	2.5	4.0	4.0	4.0	4.0	18.5
10.0	37.5	115.46	5.0	5.0	7.0	10.0	10.0	37.0
-	-	5.38	-	-	-	-	-	-
-	-	11.23	-	-	-	-	-	-
30.0	155.0	192.29	20.0	25.0	25.0	25.0	25.0	120.0
15.0	30.0	104.00	-	-	5.0	10.0	15.0	30.0
-	-	-	-	-	-	-	-	-
10.0	35.0	36.25	2.0	5.0	7.0	10.0	10.0	34.0
-	10.5	12.10	1.5	2.0	2.5	2.5	2.5	11.0
10.0	37.0	130.62	5.0	5.0	7.0	9.5	10.5	37.0
-	4.1	53.37	4.0	4.0	4.0	4.0	4.0	20.0
12.0	58.0	65.55	10.0	10.0	10.0	10.0	10.0	50.0
2.0	4.0	87.00	-	-	-	2.0	2.0	4.0
100.0	418.0	893.76	53.0	63.0	75.0	89.0	95.0	375.0

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

XII. MANIPURA

61. Loktak Lift Irr. Sch.	24.0	24.0	1.0	2.0	2.0	2.0
---------------------------	------	------	-----	-----	-----	-----

XIII. ORISSA

62. Hirakud	153.24	153.24	1.0	2.0	2.0	2.0
63. Mahanadi Delta	203.67	201.14	4.0	6.0	7.0	8.0
Puri Delta	49.06	45.94	5.0	7.0	10.0	12.0
64. Salandi	37.26	36.88	1.0	2.0	3.0	5.0

State Total:	443.23	437.20	10.0	15.0	20.0	25.0
--------------	--------	--------	------	------	------	------

XIV. RAJASTHAN

65. Chambal	229.00	79.69	10.0	10.0	12.0	15.0
66. Bhakra and Gang Canals	681.00	681.00	2.5	2.5	5.0	5.0
67. R.C.P. Stage-I	540.00	427.40	60.0	60.0	58.0	60.0
State Total:	1450.00	1188.09	75.0	75.0	80.0	85.0

XV. TAMIL NADU

68. Cauveri Irr. System	378.00	354.94	5.0	5.0	7.0	10.0
69. Lower Bhawani	105.22	105.22	1.0	2.0	3.0	4.0
70. Periyar Vaigai	63.00	61.42	1.0	2.0	3.0	4.0
State Total:	546.22	521.58	7.0	9.0	13.0	18.0

XVI. UTTAR PRADESH

71. Western Gandak	443.00	235.56	45.0	50.0	60.0	60.0
72. Ramganga	821.00	455.28	90.0	100.0	120.0	120.0
73. Sarda Sahayak	1658.00	1200.34	115.0	150.0	170.0	170.0
State Total:	2922.00	1891.18	250.0	300.0	350.0	350.0

XVII. WEST BENGAL

74. D.V.C. System	341.97	341.67	2.0	2.0	4.0	6.0
75. Kangsabati	340.75	338.38	2.0	2.0	4.0	6.0
76. Mayurakshi	226.63	225.90	1.0	1.0	2.0	3.0
State Total:	909.35	905.95	5.0	5.0	10.0	15.0
NEW PROJECTS						
GRAND TOTAL:	14765.06	11545.49	651.0	765.0	89.0	980.0

9	10	11	12	13	14	15	16	17
3.0	-	-	-	-	-	-	-	-
3.0	10.0	-	-	-	-	-	-	-
10.0	35.0	-	-	-	-	-	-	-
15.0	49.0	-	-	-	-	-	-	-
5.0	16.0	-	-	-	-	-	-	-
30.0	100.0	-	-	-	-	-	-	-
15.0	62.0	217.21	10.0	14.0	15.0	15.0	16.0	70.0
5.0	20.0	-	-	-	-	-	-	-
5.0	20.0	-	-	-	-	-	-	-
60.0	298.0	37.93	-	-	-	-	-	-
85.0	400.0	255.14	10.0	14.0	15.0	15.0	16.0	70.0
10.0	37.0	-	-	-	-	-	-	-
5.0	15.0	-	-	-	-	-	-	-
5.0	15.0	-	-	-	-	-	-	-
20.0	67.0	-	-	-	-	-	-	-
* * * * *								
40.0	255.0	-	-	-	-	-	-	-
25.0	455.0	-	-	-	-	-	-	-
285.0	1890.0	-	-	-	-	-	-	-
350.0	2600.0	-	-	-	-	-	-	-
8.0	22.0	-	-	-	-	-	-	-
7.0	21.0	5.64	1.0	1.0	1.0	1.0	1.0	5.0
5.0	12.0	-	-	-	-	-	-	-
20.0	55.0	5.64	1.0	1.0	1.0	1.0	1.0	5.0
163.0								57.0
1051.0	4500.0	2697.09	136.0	178.0	211.0	248.0	270.0	1100.0

APPENDIX-IX

YEARWISE, ITEMWISE OUTLAY (CENTRAL SECTOR) FOR THE C.A.D.
PROGRAMME DURING THE SIXTH FIVE YEAR PLAN 1980-85

(Rs. in lakhs)

Sl. No.	Item	1980-81	1981-82	1982-83	1983-84	1984-85	Total
GRANTS							
1.	CAD Estt.	260	280	310	340	360	1,550
2.	Surveys	960	1,140	1,300	1,500	1,700	6,600
3.	Evaluation Studies	-	10	10	15	15	50
4.	Warabandi	20	30	40	50	60	200
5.	Subsidy to Medium, Small & marginal farmers	300	360	440	500	600	2,200
6.	Crop Compensation	25	30	40	50	55	200
7.	Construction of field channels	1,200	1,450	1,750	1,950	2,150	8,500
8.	Adaptive trials, training etc.	40	50	60	70	80	300
LOANS							
9.	Purchase of equipment	65	140	150	150	155	660
10.	Construction of field channels	1,080	1,300	1,575	1,750	1,945	7,650
11.	For Equity capital contribution by the State Govt.	350	250	200	100	100	1,000
12.	Special Loan Fund	100	100	150	150	100	600
13.	Spill over expenditure	300	100	-	-	-	400
DIRECT EXPENDITURE BY THE CENTRE							
14.	W.M.D. Office equipment	5	8	10	12	15	50
15.	Studies etc.	5	7	8	10	10	40
Total: 4,710 5,255 6,043 6,647 7,345 30,000							

APPENDIX-X

BENEFITS FROM COMMAND AREA DEVELOPMENT PROGRAMME
YIELDS PER HECTARE OF PRINCIPAL CROPS IN THE SELECTED COMMAND AREA

Sl. No.	Name of the State	Name of the Irrigation Command	Average Yield quintals per hectare Before intro- duction of CAD Programme	Average Yield After intro- duction of CAD Programme	Additional yield over the country (Before OFD)
1	2	3	4	5	6
1. Andhra Pradesh <u>Kharif Paddy</u>					
		Pochampad	22.28	34.63	12.35
		Nagarjunasagar (Left bank)	26.19	36.60	10.41
		Nagarjunasagar (Right bank) (1978-79)	13.40	29.96	16.56
		Tungabhadra	29.63	32.31	2.68
2.	Rajasthan	Chambal (Raj.)	21(base)	41.68 (1978-79)	20.68
3.	Gujarat	Kadana	20	22(1977-78)	2.00
		Ukai Kakrapar	10	12.25	2.25
4.	Maharashtra	Itiadoh	26	30.00	4.00
		Bagh	25.00	30.00 (1977-78)	5.00
5.	Uttar Pradesh	Gandak(western)	10.25	16.90	6.65
<u>Summer Paddy</u>					
1.	Andhra Pradesh	Pochampad	29.76	31.57	1.81
2.	Maharashtra	Itiadoh	40.00	44.00	4.00
		Bagh	30.00	40.00	10.00
<u>Kharif Bajra (Pearl Millet)</u>					
1.	Karnataka	Malaprabha	20.00	23.00	3.00
		Ghataprabha	10.00	14.00	4.00
2.	Gujarat	Kadana	5.16	9.45	2.29
<u>Wheat</u>					
1.	Gujarat	Kadana	25.00	30.00	5.00
		Ukai Kakrapar	11.00	14.86	3.86
2.	Rajasthan	Chambal(Kota)	12.00(base)	23.06	11.06
3.	Karnataka	Malaprabha	22.50	35.00	12.50
		Ghataprabha	30.00	35.00	5.00
4.	Uttar Pradesh	Gandak	8.00	12.50	4.50

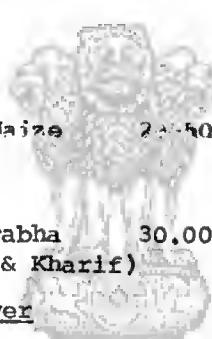
1	2
---	---

1	5	1	6
---	---	---	---

Jowar (Sorghum)

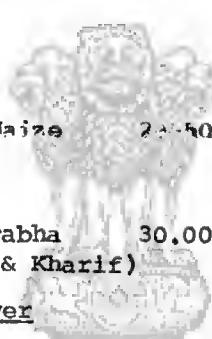
1.	Gujarat	Ukaikakrapar	6.00	8.07	2.07
2.	Karnataka	Malaprabha (Kharif)	27.50	35.00	7.50
		Ghataprabha (Kharif)	30.00	35.00	5.00
		Malaprabha (Rabi)	25.00	35.00	10.00
		Ghataprabha (Rabi)	30.00	35.00	5.00
3.	Andhra Pradesh	Tungabhadra (Kharif)	6.57	27.79	21.22
4.	Rajasthan	Chambal(Kota) Kharif (Distt. Av. base)	4.80	8.86 (1978-79)	4.06

1. An


Rabi Maize 22.50 36.22 10.59

13.88

2. Kar


Ghataprabha 30.00 35.00 5.00
(Rabi & Kharif)

Sunflower

1.	Karnataka	Malaprabha (Rabi)	5.00	17.00	12.00
		Ghataprabha (Rabi)	10.00	12.00	2.00

Gram

1.	Rajasthan	Chambal	6.00	7.15	1.15
		<u>Groundnut</u>			

1.	Karnataka	Malaprabha (Kharif)	12.50	18.00	5.50
		Ghataprabha (Kharif)	15.00	18.00	3.00